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A Study of the Invertebrates and Fishes of Salt Marshes in Two Oregon Estuaries

by

Duane L. Higley and Robert L. Holton

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This study examines the invertebrate and fish life in the estuarine tidal marshes of Siletz and Netarts Bays, Oregon. Sweep nets, corers, enclosures, and clip-quadrat samplers were used to collect both quantitative and nonquantitative samples of invertebrates in level marsh, pan, tidal creek, and tidal flat habitats located in seven study areas representing various types of marsh. Fish in these habitats, as well as in a slough and in bay channels, were sampled by seine and otter trawls. Community taxonomic composition and trophic structure, (Continued)

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along with fish stomach contents, are presented as relative frequency histograms and pie charts. Dominant invertebrate taxa in terrestrial collections were Acarina, Homoptera, and Diptera, and in aquatic collections were Capitellidae (polychaeta), Oligochaeta, *Gnorimosphaeroma* (Isopoda), and *Anisogammarus* and *Corophium* (Amphipoda). Three-spine stickleback and young staghorn sculpin were by far the most common fish species throughout the marsh zone; juvenile salmonids and other species were captured only in submerged level marshes and in a slough. Trophic structure of terrestrial and aquatic invertebrate communities was generally heavily weighted to detritivores and scavengers. The herbivore component increased from low marsh to high marsh and was the dominant trophic type in the higher vegetation (sweep net collections) of the high marsh. Araneae was the dominant invertebrate carnivore in the terrestrial communities. Fish consumed primarily aquatic animals, even those captured in tidal creek and submerged level marsh habitats where tidal inundation would be expected to make terrestrial foods available. The detritus food chain appears more important than the grazing food chain in the terrestrial communities, and transfer of marsh products to aquatic food chains apparently is predominantly through the export of detritus rather than by the direct consumption of terrestrial animals.

ABSTRACT

This study examines the invertebrate and fish life in the estuarine tidal marshes of Siletz and Netarts Bays, Oregon. Sweep nets, corers, enclosures, and clip-quadrat samplers were used to collect both quantitative and nonquantitative samples of invertebrates in level marsh, pan, tidal creek, and tidal flat habitats located in seven study areas representing various types of marsh. Fish in these habitats as well as in a slough and in bay channels were sampled by seine and otter trawls. Community taxonomic composition and trophic structure, and fish stomach contents are presented as relative frequency histograms and pie charts. Dominant invertebrate taxa in terrestrial collections were Acarina, Homoptera, and Diptera, and in aquatic collections were Capitellidae (polychaeta), Oligochaeta, *Gnorimosphaeroma* (Isopoda), and *Anisogammaus* and *Corophium* (Amphipoda). Threespine stickleback and young staghorn sculpin were by far the most common fish species throughout the marsh zone; juvenile salmonids and other species were captured only over submerged level marshes and in a slough. Trophic structure of terrestrial and aquatic invertebrate communities was generally heavily weighted to detrivores and scavengers. The herbivore component increased from low marsh to high marsh and was the dominant trophic type in the higher portions of vegetation (sweep net collections) of the high marsh. Araneae was the dominant invertebrate carnivore in the terrestrial communities. Fish consumed primarily aquatic animals, even those captured in tidal creek and submerged level marsh habitats where tidal inundation would be expected to make terrestrial foods available. The detritus food chain appears more important than the grazing food chain in the

terrestrial communities, and transfer of marsh products to aquatic food chains apparently is predominantly through the export of detritus rather than by direct consumption of terrestrial animals. This report can be used to evaluate the impact of Corps of Engineers projects on marshlands along the Oregon coast.

PREFACE

This report provides baseline and food chain data on the invertebrate and fish fauna of several marsh habitats located in Siletz and Netarts Bays, Oregon. The study, sponsored by the U.S. Army Coastal Engineering Research Center (CERC), evaluates the trophic value of Pacific Coast salt marshes to provide information for assessing the impact of coastal engineering projects on these resoureces. Results and conclusions presented here are those of the authors and are not necessarily accepted by CERC or the Corps of Engineers.

The following people employed by the School of Oceanography, Oregon State University, contributed to the production of this report: Kim Chalopka, Duane Higley, Robert Holton, Kim Jones, John Morgan, Jean Shaffer, and Francis Stilwell. In addition, several student employees supported in part by the College Work Study Program worked on the project.

Animal identification and determination of trophic type was aided by Dr. Norman Anderson, Thomas Dudley, Dr. George Ferguson, Barry Frost, Dr. John Lattin, Dr. Gerald Krantz, and Gary Peters of the Department of Entomology, and Dr. Christopher Baynes of the Department of Zoology at Oregon State University.

R. M. Yancy and A. K. Hurme were the CERC contract monitors for the report, under the general supervision of E. J. Pullen, Chief, Coastal Ecology Branch, Research Division.

Comments on this publication are invited.

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A STUDY OF THE INVERTEBRATES AND FISHES OF SALT MARSHES IN TWO OREGON ESTUARIES

by

Duane L. Higley and Robert L. Holton

I. INTRODUCTION

North American salt marsh ecosystems have been intensively studied because of their high productivity and relatively simple structure. However this attention has been mainly directed to the Atlantic coast marshes. Prior studies have investigated community structure and population energy flow (Odum and Smalley, 1959; Teal, 1962; Nixon and Oviatt, 1973), nutrient pathways using radionuclide tracers (Marples, 1966), and faunal distribution (Barnes, 1953; Davis and Gray, 1966). Studies centered in the Chesapeake Bay region, the Carolina coast; Sapelo Island, Georgia; and Barataria Bay, Louisiana, have produced the following information on salt marsh characteristics: a) Primary productivity is high (about 445 to 2883 grams dry weight per square meter per year, comparable to the most fertile natural and agricultural systems; b) little of the marsh production is grazed (<10 percent), most ending up in detritus food webs of the estuary; and c) the nutritional content of detrital particles consumed is enhanced by adhering decomposer organisms (summarized by de la Cruz, 1973). Because of the major importance of detritus food chains in marsh and other estuarine habitats, recent work has emphasized determining the rates and outputs of marsh detritus (Reimold, et al., 1975), and the structure of the dependent heterotrophic food chains (Odum and Heald, 1975).

Floral composition and zonation of salt marshes on the Pacific Coast have been documented (MacDonald, 1977). The major study of Oregon salt marsh vegetation is by Jefferson (1974), who characterized and mapped essentially all of Oregon's coastal marshes except those in the Columbia River. Her descriptions of species composition, and community structure, succession and distribution apply to Washington marshes (MacDonald, 1977). Further description of marsh composition and zonation is provided by Frenkel, Boss, and Schuller (1978). They studied the transition zone between intertidal marshes and contiguous upland vegetation in Oregon and Washington.

Eilers (1979) conducted an intensive study of the salt marshes of Nehalem Bay, Oregon. He determined plant associations and zonation relations, and measured primary production and detrital output. Net primary production varied between 518 and 1,936 grams per meter square per year. An excess of 90 percent of the intertidal net production was transported into the estuary as detritus.

The Environmental Protection Agency (EPA) is presently studying salt marsh plant productivity in Siletz and Netarts Bays, Oregon. The EPA study is part of a larger program concerned with defining wetland boundaries, the reactions of wetlands to perturbation, and the effects of wetlands on water quality (H. Kibby, Corvallis Environmental Research Laboratory, EPA, Corvallis, Oregon, personal communication, 1979).

Information on the structure and ecology of the animal communities of Pacific Coast salt marshes is incomplete. MacDonald (1969) studied

the local, seasonal, and latitudinal variations in molluskan fauna in level marsh and tidal creek habitats along the Pacific coast from Baja, California, to Washington. He found *Assiminea translucens*, a small prosobranch, to be ubiquitous in level marshes of this region, with *Littorina newcombiana* (Prosobranchia) and *Phytia myosotis* (Pulmonata) joining *Assiminea* to form a characteristic Oregonian assemblage. Tidal creek mollusks were mostly bivalves, a *Macoma-Mya* assemblage characterizing the Oregonian Province. The number of species recorded from each habitat increased from north to south. Level marsh mollusks fed predominantly on algae or plant detritus by rasping; tidal creek forms included deposit and suspension feeders as well as predators and scavengers.

Whitlatch (1974) observed the growth, production, and seasonal abundance patterns of *Batillaria zonalis*, a small introduced prosobranch, in pans, tidal creeks, mudflats, and *Salicornia* level marshes of Tomales Bay, California. Abundance was greatest in pans and creeks, but recruitment was lacking in the creeks which apparently resulted in the relative stability of the populations there. Influx was likely due to immigration from the pans where recruitment was successful.

Two studies have been made of insect populations of San Francisco Bay marshes. Using a sweep net for collecting, Lane (1969) identified 124 species in *Spartina-Salicornia* marshes. The majority of species were in the orders Diptera (flies) and Homoptera (planthoppers); Delphacidae (Homoptera), and Chloropidae, Ephydridae, and Chironomidae (all Diptera) were the dominant families. Cameron (1972) used a clip-quadrat method in a similar marsh to study insect trophic diversity and its

relation to resource availability (living and dead plant materials). He found that herbivore diversity increased with primary production, and that saprovore diversity increased during periods of detrital input. In general, trophic deversity showed seasonal patterns relating to physical factors and (more clearly) to resource availability. Cameron hypothesized that seasonal increases in diversity occurred as seasonal species joined persistent species in exploiting expanding resources.

The only major study of trophic relations in a Pacific coast salt marsh ecosystem is the Coos Bay, Oregon, study sponsored by the National Science Foundation (Hoffnagle, et al., 1976). Short-term field and laboratory studies were used to measure net primary production, detrital production, decomposition rate, nutrition of key species, and the composition of insect and fish populations of several marsh sites.

In recent years, interest has increased in the role of estuarine food chains in the growth and survival of seaward migrating juvenile salmonids along the Pacific Northwest coast. There is evidence that those juveniles which benefit from favorable estuarine conditions have a better chance at sea (e.g., Riemers, 1971). These fish seem to adjust their habitat and feeding strategies to exploit freshwater and marine as well as estuarine food chains while making the transition to marine life (Mason, 1974). The fish are found in some marsh habitats, especially tidal creeks. Dunford (1975) found juvenile chum salmon (*Oncorhynchus keta*) and chinook salmon (*O. tshawytscha*) residing in sloughs and creeks of the Fraser River estuary marshlands (British Columbia) in the spring and summer. The salmon consumed a variety of terrestrial, planktonic,

and benthic foods. Dunford identified 13 other fish species in these habitats.

Juvenile salmonids in nonmarsh habitats may exploit marsh-based food chains. In the Squamish River estuary (British Columbia), Cliff and Stockner (1973) discovered heavy feeding by salmon on amphipods (principally *Anisogammarus* spp.) which are largely marsh-dependent. Juvenile chum salmon in the Nanaimo estuary (British Columbia) heavily exploit harpacticoid copepods and thus use a food chain that depends on detritus from the marshlands (Healey, 1979).

Although past studies of Pacific coast salt marshes have been limited, the data collected suggest similarities of structure and function between these marshes and the Atlantic coast marshes; e.g., levels of primary production, contribution to detritus-based food chains, and some aspects of community composition. Important questions remain regarding the use of Pacific coast marsh habitats and food chains by various fish species, especially juveniles; and the trophic structure and function of these marshes should be determined, especially to evaluate the value of marshland in relation to human use.

This study characterizes the animal communities and food chains of marshes in Siletz and Netarts Bays, Oregon. The objectives were to develop taxonomic lists, to characterize the trophic structure of marsh invertebrate communities, and to identify the principal fish species using the marsh and marsh-related habitats. In addition, food habits of these fish were studied to determine marsh food-chain relations.

II. DESCRIPTION OF STUDY AREAS

1. General.

Salt marshes of the Pacific Northwest are of recent origin and, in comparison to the Atlantic marshes, are limited in size and distribution. The steep and rocky coastlines of Washington, Oregon, and California restrict suitable marsh habitats to a few bays, estuaries, and lagoons. These marshes generally lack the thick peat layers which reflect long term accretion (MacDonald, 1969).

In Oregon, interglacial deposits filled river mouths, and post-Pleistocene drowning produced extensive tidelands in the northern and central bays. More rapid sediment deposition in the southern bays matched rises in sea level and thus restricted tideland development. All of the 27 estuaries in Oregon are presently accumulating sediment. Fires in the mid-19th century and the Tillamook fire in 1933, augmented by logging and other detrimental land-use practices, have increased the erosional sources of bay deposits (Jefferson, 1974).

The climate of the Oregon coast is wet-temperate. Annual precipitation averages about 180 centimeters and temperature about 10 degrees Celsius. The frost-free season lasts 250 to 300 days, and freezing weather is infrequent. Pacific winter storms accompanied by gale-force winds are common, but generally lack the destructive force of tropical and convective storms common to the Atlantic coast. Winter freshets in coastal rivers and the diluting effects of the Columbia River discharge

may substantially reduce estuarine salinities. In light of this, Kistritz (1978) suggests that the term "salt marsh" may often be inappropriate in describing tidal marshes of the Pacific Northwest.

Mixed diurnal tidal fluctuations result in abrupt changes of immersion and exposure times at about 2.7 meters or mean higher high water (MHHW), where mean lower low water (MLLW) is the zero datum. Below MHHW a distinctive salt marsh vegetation characterized by pickleweed (*Salicornia virginica*), commonly known as "low marsh," extends down to about mean lower high water (MLHW). Above MHHW, a "high marsh," characterized by tufted hair grass (*Deschampsia caespitosa*), grades into terrestrial vegetation at about extreme high water (EHW). Jefferson (1974) lists six vegetation types for Oregon saline-brackish intertidal marshes: (a) low sand marsh, (b) low silt marsh, (c) sedge marsh, (d) immature high marsh, (e) mature high marsh, and (f) bulrush and sedge marsh. One to seven vegetative communities may occur within each vegetation type. These communities and marshes form complex and somewhat variable relations with each other and with tidal level which Jefferson treats as successional. Three successional patterns occur, depending on substrate (sand versus silt) and freshwater influence. Lyngbeye's sedge (*Carex lyngbyli*) is intermediate in all three patterns, widely distributed, and considered by Jefferson to typify Oregon salt marshes.

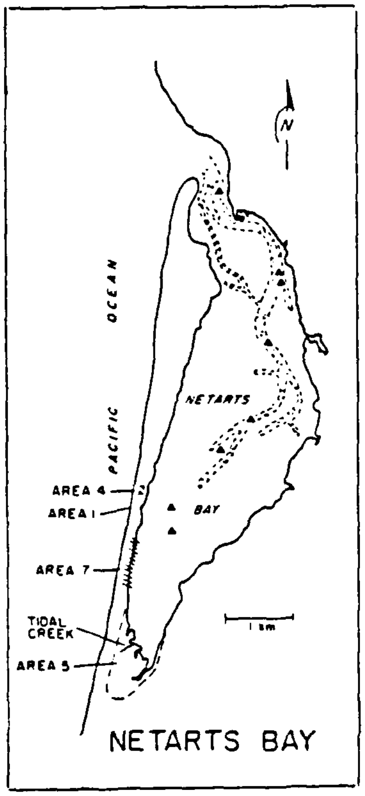
Low marshes typically advance through coalescing colonies of seaside arrowgrass (*Triglochin maritima*) or rhizomous mats of pickleweed. The lower edges of the marsh are also commonly lined with three-square bulrush (*Scirpus americanus*). Transitions from low marsh to high marsh

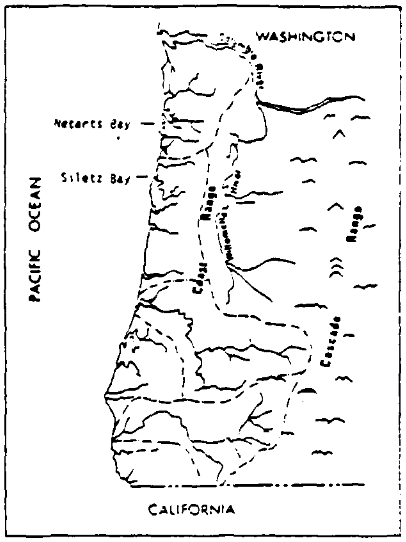
may be gradual or abrupt across an eroded bank. Tidal-flat to high marsh eroded banks may be 1 meter high. Extensive diking, landfills, and other man-induced effects have significantly changed the marshlands. Jefferson (1974) states that undiked old, high marsh is nearly nonexistent in Oregon.

2. Siletz and Netarts Bays.

Siltez Bay, a spit-protected estuary of about 4.8 square kilometers, is located on the central Oregon coast (Fig. 1). The bay receives runoff from the Siletz River and two creeks. The average witner and summer Siletz River discharge is 45 cubic meters per second and 6 cubic meters per second, respectively. Logging has caused extensive sedimentation, and diking, roadbuilding, and filling projects have restricted flushing causing tidelands to increase; therefore, the marshes are expanding. Salinity varies widely according to discharge and tidal stage. During winter freshets, the salinity of surface waters is often less than 5 parts per thousand where the Siletz River enters the bay; summer surface salinities exceed 20 parts per thousand (Rauw, 1975). Temperatures generally vary from 7 to 15 degrees Celsius (Rauw, 1975), but may exceed 18 degrees Celsius in some habitats (Table 1).

Netarts Bay, a shallow, bar-built estuary of about 10.4 square kilometers, is located on the north-central Oregon coast (Fig. 1). The bay has a very small watershed, which drains through 13 small creeks, and is therefore usually completely mixed and marine dominated. Salinities usually exceed 25 parts per thousand. Bay temperatures generally





STUDY AREAS

1 Low sand marsh
2 Low silt marsh
3 Sedge marsh
4 Immature high marsh
5 Mature high marsh
6 Netarts open bay otter trawl sites (indicated by ▲)
7 Netarts low sand marsh seine site
8 Siletz low sand marsh seine site
9 Siletz open bay otter trawl sites (indicated by ▲)

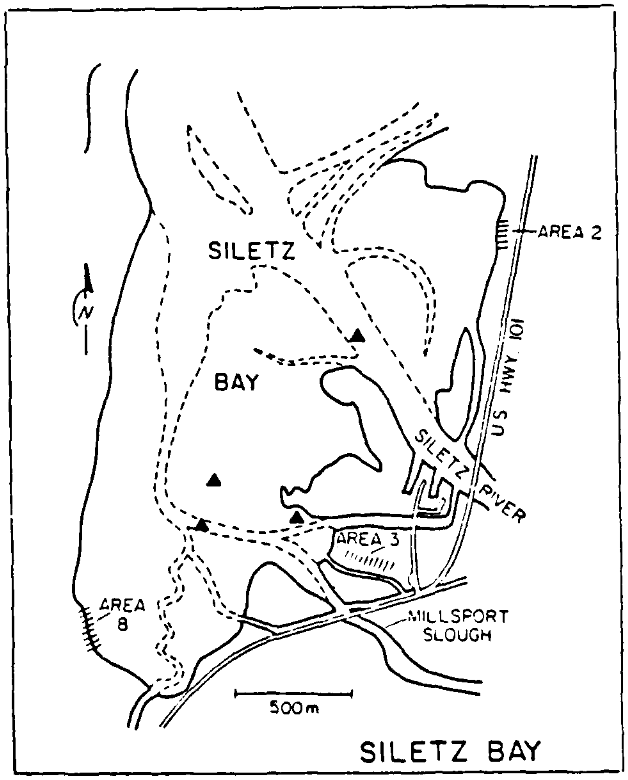


Figure 1. Location of study areas in Netarts and Siletz Bays.

Table 1. Salinity and temperature readings.

Area	Habitat	Date	Salinity (°/₀₀)	Temperature (°C)
Netarts Bay				
1	Level marsh	18 Jan. 78	--	9.0
1	Level marsh	7 Feb. 78	26	9.8
4	Tidal flat	7 April 78	29	17.0
4	Large pan	7 April 78	12	--
1	Level marsh	7 April 78	29	--
6	Bay channel	3 June 78	31	--
1	Level marsh	22 July 78	36	27.0
1	Level marsh	17 Oct. 78	33	20.0
5	Tidal creek	17 Oct. 78	33	20.0
5	Marsh channel	1 Nov. 78	18-30	7.0-11.8
5	Pan	1 Nov. 78	13	--
7	Tidal flat	29 Aug. 78	33	21.0
5	Tidal creek	12 April 79	15	11.0
5	Pan	12 April 79	19	11.0
7	Tidal flat	12 April 79	28	11.0
Siletz Bay				
Area	Habitat	Date	Salinity (°/₀₀)	Temperature (°C)
3	Level marsh	18 Jan. 78	--	9.5
3	Level marsh	6 Feb. 78	28	10.5
3	Level marsh	6 April 78	9	12.5
2	Level marsh	6 April 78	9	12.5
3	Millport sl.	24 June 78	21	--
3	Tidal creek	21 July 78	26	28.0
2	Level marsh	21 July 78	30	25.0
3	Tidal creek	21 July 78	26	23.0
9	Tidal flat	18 Sept. 78	18-20	18.0
3	Level marsh	16 Oct. 78	25	15.5
2	Level marsh	16 Oct. 78	23	16.0
3	Tidal creek	26 April 79	18	17.0
8	Level marsh	26 April 79	27	14.0
3	Pan	26 April 79	15	18.0

reflect ocean temperatures (about 8-15 degrees Celsius); however, temperatures greater than 26 degrees Celsius may occur in the summer over tidal flats and marshlands (Table 1). Logging on the watershed from 1951 to 1971 caused extensive siltation in the bay, but sediment input now is apparently low and stable (Kreag, 1979).

High and low marshes fringe the inner shore of the spit, and a large area of high marsh occupies the southern end of the bay. This marsh was once diked and used for pasture, but has since reverted to nearly natural drainage patterns under state ownership.

3. Bay Study Areas.

Nine study areas were established in the two estuaries (Fig. 1). Areas 1 to 5 were chosen to represent the specific vegetation types listed by Jefferson (1974), and were sampled most thoroughly. The other areas are open bay and low marsh habitats each sampled once each for fish. Elevation data for areas 1, 3, and 4 are based on nearby EPA study sites (H. Kibby, personal communication, 1979).

The study areas were:

a. Area 1, Low Sand Marsh (Netarts Spit). This beach is sandy (Table 2) and supports a mixed cover of pickleweed and saltgrass (*Distichlis spicata*). The lower edge of the marsh is lined with three-square bulrush. Invertebrate samples were taken in the pickleweed-saltgrass zone (about 2.4 meter above MLLW), fish samples in the three-square bulrush zone and the adjacent tidal flat ($\leq$2.1 meters above

Table 2. Substrate characteristics of marsh soil at level marsh sampling sites.[1]

River Marsh	Netarts Low Sand (area 1)	Siletz Low Silt (area 2)	Siletz Sedge (area 3)	Netarts Immature High (area 4)	Netarts Mature High (area 5)
Debris	3.3%	10.1%	15.6%	66.1%	23.0%
Sediment	96.7%	89.9%	84.4%	33.9%	77.0%
Sand	92.5%	12.8%	1.1%	67.8%	87.0%
Mud	7.5%	87.2%	98.9%	32.2%	13.0%
Sediment Size Class (mm)					
>1.00	0.0%	0.2%	0.2%	0.0%	0.0%
0.500-1.00	0.0%	0.3%	0.3%	0.1%	0.0%
0.250-0.500	71.8%	3.2%	0.3%	2.7%	5.6%
0.125-0.250	19.5%	2.3%	0.3%	57.6%	80.6%
0.063-0.125	1.2%	7.0%	0.1%	7.4%	0.8%
< 0.063	7.5%	87.2%	98.9%	32.2%	13.0%

[1] Sample cores were processed in the following manner: (a) The whole sample was wet-sieved on a 2-millimeter screen (> 2 mm = debris, < 2 mm = sediment); (b) the sediment fraction was wet-sieved on a 0.063-millimeter screen (> 0.063 mm = sand, < 0.063 mm = mud); (c) the sand fraction was dry-sieved on 1.0-, 0.5-, 0.25-, and 0.125-millimeter screens; and (d) all fractions were dry-weighed. The debris fractions included roots, shells, and similar materials.

MLLW). A debris line of dead eelgrass (*Zostera marina*) frequently forms at varying levels along this marsh.

b. Area 2, Low Silt Marsh (North of Siletz River). This is an area along Highway 101 of prograding low marsh. The substrate in the marsh and the adjoining tidal flat is mud (Table 2). The lower edge of the marsh is formed in interrupted colonies of seaside arrowgrass invaded by Lyngbeye's sedge, which is the dominant species at higher elevations. Aquatic invertebrate samples were taken in this transition zone which is characterized by frequent flooding, pools of standing water among the plants, and dense populations of amphipods and isopods. Terrestrial invertebrate samples were collected higher in the sedge stand. Fish samples were collected about 100 meters south of these sites in a series of small tidal creeks that extend from high marsh through the sedge community and through the bulrush community at the edge of the marsh.

c. Area 3, Sedge Marsh (South of the Siletz River). This marsh has muddy soil (Table 2) with vegetation dominated by sedge, but floods less frequently than the low silt sedge marsh. Elevation in the region of level marsh invertebrate sampling site is about 2.3 meters above MLLW. A dendritic system of small tidal creeks laces the marsh and apparently receives some seepage through earthen dikes. A major creek (maximum 10 meters wide, 0.7 meter deep) dissects the marsh in an east-west direction. Water in the creek flows in both directions from about the center of the marsh where the channel is but a shallow depression in the level marsh. Fish and aquatic invertebrate samples were taken in various creek, pan, and tidal flat habitats, as well as in Millport

Slough which borders the marsh on the southwest. All of these habitats have muddy substrates.

d. Area 4, Immature High Marsh (Netarts Spit). This marsh, located slightly north of the low sand marsh, has an elevation of about 3.2 meters above MLLW and is bordered by an eroded bank. The dominant vegetation is tufted hairgrass and Pacific silverweed (*Potentilla pacifica*). The soil is peaty with an underlayer of fine sand (Table 2). A large pan (40 by 10 meters) retains tidal and runoff water during the winter and spring but dries up by mid-summer.

e. Area 5, High Marsh (South End of Netarts Bay). A branch of Jackson Creek, which flows directly into the ocean, flows through this 40-hectare marsh. The marsh is dissected by numerous deep tidal creeks with several openings into the bay. These creeks and the northern edge of the marsh have steep eroded banks. The marsh soil is peaty with a sand underlayer. Creek bottom and adjoining tidal flats from brown sandy mud to black mud. Marsh vegetation is primarily tufted hairgrass but the composition varies; some areas are dominated by Pacific silverweed, pickleweed, rush, and other plants. The creeks are often clogged with rotting eelgrass. Several pans are scattered throughout the marsh. Those connected with creeks retain water, while others tend to dry out in mid-summer.

f. Area 6, Netarts Open Bay. This designates the bay channel and tidal flat regions in which otter trawls were used to obtain estuarine fish samples. The channels are mostly shallow, many of them having eelgrass beds.

g. Area 7, Low Sand Marsh Seine Site (Netarts Bay). This 1-kilometer section of low sand marsh, located immediately south of area 1, is a narrow strip (about 3 to 20 meters wide) that is mostly vegetated by pickleweed. Plant cover is variable, and the shoreline is irregular due to erosion.

h. Area 8, Low Sand Marsh Seine Site (Siletz Bay). This 0.4 kilometer strip of low marsh, located on the southeast edge of the Siletz spit, has high marsh along eroded banks.

i. Area 9, Siltez Open Bay. This designates tidal flats and channels which were sampled for estuarine fish using an otter trawl.

Selection of the study areas was partly based on EPA use of Areas 1, 3, and 4 for their productivity studies. The intent was to establish site specific data on the animal communities of marshes where the EPA studies were being conducted. The EPA work focused on determining primary productivity and decomposition rates for selected, nearly mono-specific vegetation types (pure stands) and determining the availability of marsh production to detritus-based food chains. The results of this work are presently being compiled (H. Kibby, personal communication, 1979). Initial conclusions are that primary productivity rates range from about 500 to 1,800 grams per square meter per year, with Lyngbeye's sedge having the highest productivity. Biomass of this sedge peaks in June-July at about 1,200 grams per square meter per year. Seaside arrowgrass apparently decomposes more rapidly than other species studied, and is the only species which showed evidence of grazing (probably by deer).

The marshlands provide a variety of habitats and subhabitats whose properties change daily with tidal and seasonal conditions. Animal populations respond with zonations and marked flucutations which reflect life cycles, tidal exchange, and migrations to escape inundation. In this study, it was impossible to fully characterize these fluctuating populations over the variety of marshes and habitats studied. The approach was to sample the major habitat types in the marsh ecosystem (Fig. 2), and to collect comparative samples from other estuarine habitats such as tidal flats and bay channels. Extensive sampling was conducted in level marshes, the most widely distributed, and tidal creeks, the most likely contributors to aquatic food chains of the marsh habitats.

III. METHODS

1. General.

The basic objective of this research was to characterize the invertebrate and fish life of the Siletz Bay and Netarts Bay marshes. Sampling, which varied with weather and tidal conditions, was conducted at approximately 2-month intervals. Greatest sampling effort was made in the spring and summer. Most collections were either one-time surveys or repeated as opportunities arose. The only habitat for which seasonal data was collected is the submerged level marsh (invertebrate fauna). On some occasions, two work crews were used to exploit a brief sampling time frame (e.g., a single high tide). Table 3 lists the various sampling devices and their uses. Appendix A provides suggestions for gear improvement.

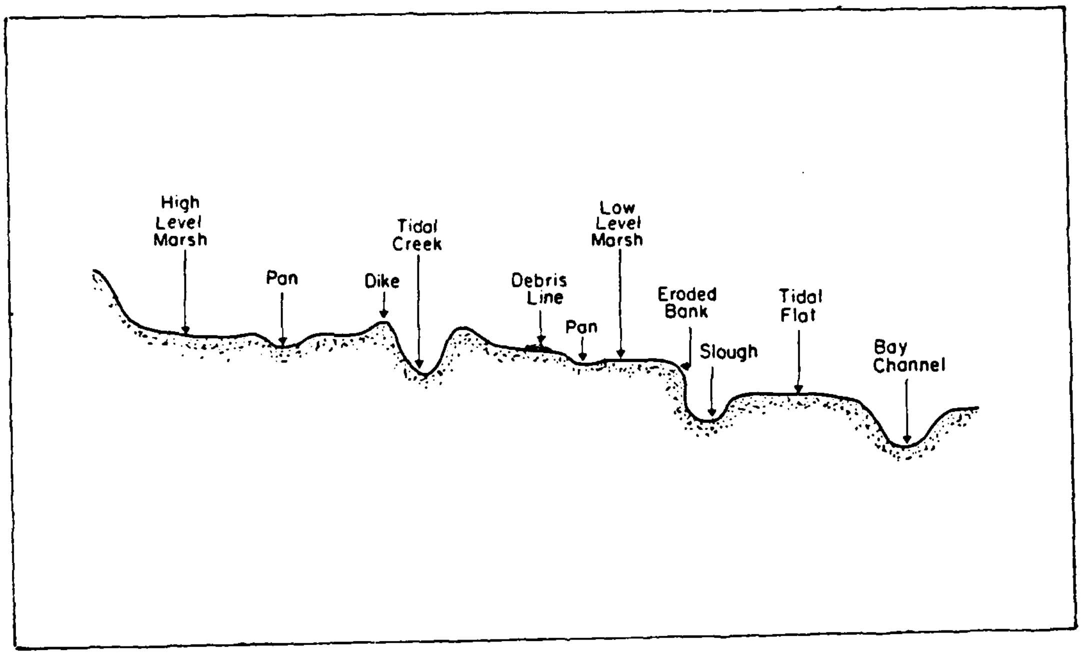


Figure 2. Habitats of the salt marsh ecosystem (adapted from Ranwell, 1972).

Table 3. Description of sampling gear and methods.

Device	Description	Use
Small corer	5.1-cm diameter tube with handles	Quantitative infauna sampling; also sediment sampling
Medium corer	10.2-cm diameter tube with handles	Quantitative infauna sampling
Large corer	15.2-cm diameter tube with handles	Quantitative infauna sampling
Small enclosure	27-cm diameter by 30-cm high plastic cyliner	Quantitative sampling of invertebrates of strand line
Large enclosure	1-m-diameter by 1-m high canvas cylinder with lead-line and floats	Quantitative sampling of invertebrates in submerged level marsh
Aquatic sweep net	0.5-mm mesh nitex	Quantitative (with large enclosure) and nonquantitative sampling of submerged invertebrates
Terrestrial sweep net	fine mesh muslin	Semiquantitative sampling of invertebrates on exposed vegetation
Small drift net	0.5-mm mesh nitex net on 12.5-cm-diameter frame	Nonquantitative sampling of drift organisms in small tidal creeks
Large drift net	0.5-mm mesh nitex net on 25-by 50-cm frame	Nonquantitative sampling of drift organisms in large tidal creeks
Clip quadrat	25-by 25-cm wooden frame within which plant material was clipped loose from the soil	Quantitative sampling of invertebrates on exposed level marsh
3-m seine	common-sense seine with 0.6-cm mesh	Fish collection in small tidal creeks and pans
15-m seine	1.3-cm mesh body and 0.6-cm mesh bag	Fish collection in large tidal creeks and over low (level) marshes
52-m seine	2.5-cm mesh body and 1.3-cm mesh bag	Fish collection over low marshes and adjacent tidal flats and sloughes
Otter trawl	5-m trawl with 3.2-cm mesh body and 0.6-cm mesh cod end	Fish collection in bay channels and mudflats

2. Invertebrate Studies.

Aquatic invertebrate samples from level marsh, pan, tidal creek, and adjacent tidal flat habitats were routinely processed and preserved in the field using a 5 to 10 percent buffered seawater formalin solution. Occasionally, it was necessary to process samples in the laboratory after storage in an ice chest for a day. Such treatment had no observable effect on the stored animals. Except for terrestrial and certain core samples, all samples were sieved on 0.5 millimeter screens or were obtained with 0.5 millimeter mesh nets.

After several days storage in formalin solution, the samples were transferred to a 70 percent isopropanol and stained with rose bengal or a similar stain to enhance visibility of the animals during sorting. Samples were sorted under a 3-diopter illuminated lens to broad taxonomic groups, and later identified. Usually, crustaceans, polychaetes, and bivalves were identified to genus or species, insects to family, and other groups to higher taxa (order, class, etc.). When appropriate, life stage (e.g., adult, larva, pupa) was recorded. Invertebrate classification follows Barnes (1974) and Borror, DeLong, and Triplehorn (1976).

The aquatic samples varied widely in quantity of debris and number of animals collected. To facilitate processing, the samples were separated by stacked sieves into two size groups (0.5 to 2 millimeters, and >2 millimeters) or split quantitatively with a Folsom plankton splitter. This process was especially useful for samples collected with the large enclosure in the fall when detached vegetation was present.

a. Level Marsh. The principal method for collecting submerged invertebrates on the level marshes was the large enclosure (Table 3). It was dropped over a preselected sample point and secured at the soil by standing on the leadline, which closely conformed to the soil contours. The 0.5 millimeter mesh aquatic sweep net was then repeatedly swept within the enclosure until capture rates were very low or zero. The animals and debris were concentrated and preserved. This method provides a semi-quantitative measure of the aquatic and terrestrial animals found near or on submerged vegetation, although in a few cases it was difficult to remove all of the highly abundant isopods found in the low silt marsh (Siletz Bay) study site.

Large enclosure studies were designed primarily for the low marshes although a single sample set was collected on the immature high marsh during an extremely high winter tide. Samples from the low marshes were collected on three to four occasions.

Large enclosure sample sites were established where a stand of selected type of vegetation occurred in a reasonably accessible location. Each site was a 10-by 10-meter grid divided into 100 sampling areas. On each sampling day, four randomly preselected areas were sampled. Each area was sampled only once during the study.

A similar sampling plan was established to study the infauna of level marshes. A plug of soil and roots 10.2 centimeters in diameter and up to 25 centimeters deep was removed at selected sampling areas in a grid (separate from but near to the large enclosure grid). The plug

was disaggregated by hand under water and then sieved on a 0.5 millimeter screen. Early results showed that the majority of the animals were near the surface, so later samples wre only 5 to 10 centimeters deep. It was also decided that the few animals collected and the relative unlikelihood of their directly entering aquatic food chains did not warrant the time and effort required for extensive sampling. Therefore, only one set of four samples per marsh was collected and completely processed.

Sampling of terrestrial invertebrates of the level marsh was conducted during low tides with the terrestrial sweep nets, clip-quadrat method, and small enclosure (Table 3). One set of samples was taken at each marsh. Collections were planned during the warmest and driest period of the years, but an unusually wet season forced the postponement of several collecting trips. The collections were finally accomplished during favorable tides and weather on 29 August 1978 (low sand and immature high marshes of Netarts Bay), 7 September 1978 (low silt and sedge marshes of Siletz Bay), and 25 September 1978 (mature high marsh of Netarts Bay). On these dates, air temperature was 19 to 24° Celsius, wind 0 to 16 kilometers per hour, and the sky sunny to overcast.

All samples were taken at low tide. The wind was minimal, the air temperatures were moderate, and the marsh vegetation was slightly damp. Within each level marsh type, sample sites met the following criteria: (1) selected vegetation community, (2) uniform vegetational cover, (3) level ground, (4) easy accessibility, and (5) no evidence of recent disturbance. A 10-by 10-meter grid at each site was measured and marked off by corner stakes.

The terrestrial sweep net sampling method (Table 3) was adapted from Davis and Gray (1966). The net was vigorously swept back and forth across the upper parts of the vegetation through an horizontal arc of about 1 meter. Following each sweep, one step was taken and the direction of the net was reversed. Four samples, each consisting of 20 strokes (10 in each direction), were obtained, one along each edge of the perimeter of the grid.

After each sample, the contents of the net were placed in a large ethyl acetate-charged killing jar and later transferred to a wide-mouth specimen jar. The samples were cooled in an ice chest for processing in the laboratory where they were then stored in a cold room until the damp and sometimes succulent plant debris could be removed. The insects were sorted and stored dry except for soft-bodied species which were preserved in 70 percent isopropanol.

At each marsh grid, four randomly preselected points were sampled by the clip-quadrat method (Table 3). The vegetation was first clipped off 15 centimeters above the ground. The remaining vegetation was then sliced off at the ground level with a sharp knife and placed in a heavy plastic bag along with any plant litter that could be gathered at the base of the plant. Roots were not collected. Insects seen crawling on the ground inside the quadrat frame were also deposited in the bag. The bags were inflated and securely fastened to avoid crushing the collected plants and insects. The inflated bags were packed in an ice chest for transport to the laboratory. In the laboratory, the plant material was processed in a Berlese-Jullgren apparatus for 7 days. The insects were preserved in small specimen jars filled with 70 percent isopropanol.

b. Debris Line. Invertebrate life of a 40-by 1-meter (approximate) debris line on the low sand marsh was sampled using the small enclosure method (Table 3). Four randomly chosen areas in the line were sampled by pushing the small enclosure through the debris (principally eelgrass) and removing the enclosed plants and invertebrates. The samples were processed in the same manner as the clip-quadrat samples.

All of the terrestrial samples were sorted in a flat container under a binocular dissecting scope. Terrestrial sweep net samples, which often contained considerable plant debris, were sorted in a white enamel pan. Samples processed in the Berlese-Tullgren apparatus were sorted in a petri dish. Larvae and all animals less than 0.5 millimeter were not included in the data.

c. Pan. Several samples were taken in pans in immature and mature high marsh using the aquatic sweep net method (Table 3). Some laboratory observations of living animals were also made.

d. Tidal Creeks. Tidal creeks were sampled using small corer, large corer, and aquatic sweep net methods along transects in the mature high marsh in Netarts Bay (1 November 1978) and sedge marsh in Siletz Bay (24 June 1978). In each bay, the creeks were sampled at equal intervals as measured along the curves of the creeks, using the small corer (four samples per station), the large corer (one sample per station), and the aquatic sweep one (one sample per station). The small corer samples were 10 centimeters deep and captured small surface crustaceans and worms. Large corer samples penetrated 30 centimeters to

sample larger and deeper dwelling species such as bivalves. Small corer samples were screened on a 0.5 millimeter sieve and the large corer samples on a 2 millimeter sieve.

The mature high marsh transect was 480 meters long and included five stations spaced at 120 meter intervals). Station 1 was located at the creek mouth, the bottom of which is 28 meters in width and 0.8 meter below the level marsh. Stations 1, 2, and 3 were located below a dike, and stations 4 and 5 above the dike in a tributary creek. The creek at station 5 was 1.1 meter deep and 0.7 meter wide. Aquatic sweep net samples were taken only at stations 1, 2, and 4.

The sedge transect was 400 meters long with eight stations spaced at 50-meter intervals. The creek bisects the sedge marsh, and drains in opposite directions from a shallow center area (station 5). Maximum creek width was 10 meters and maximum depth was 0.7 meter (station 8). At station 5, the creek forms an 8-centimeter-wide depression in a sparsely vegetated, dark muddy area. Because of time constraints, stations 4 and 7 were not sampled. Two small tidal creeks in the sedge marsh were sampled by aquatic sweep net on 6 April 1978. The creeks are about 0.5 meter wide and 0.5 meter deep and form part of the dendritic system that flows into the major creek.

Drift nets (Table 3) were set in the lower regions of the creeks of the sedge and mature high marshes to collect animals that represent available fish food. Large drift net samples were collected in a small, dendritic creek in the sedge marsh on 19 December 1977, and at the

bayward mouth of the large tidal creek on 16 October 1978 and 26 April 1979. A small creek was also sampled on 6 February 1978 using the small drift net. Large drift net samples in the mature high marsh were collected at a single location in the lower region of a major tidal creek on 17 October 1978, 1 November 1978, and 12 April 1979. A small drift net sample was obtained in a small tributary on 12 April 1979.

e. Tidal flats. Infaunal samples were collected by large and medium corers (Table 3) over 30-by 60-meter grids located on tidal flats adjoining the low sand (Netarts Bay) and sedge (Siletz Bay) marshes. The grids were marked at 1 meter intervals producing 1,800 potential sample areas. Ten of these were randomly selected for each set of samples. At each area, a 10-centimeter deep medium corer sample and a 30-centimeter deep larger corer sample were collected. Medium corer samples were screened on 0.5 millimeter sieve and the large corer samples on a 2-millimeter sieve.

3. Fish Studies.

Fish were collected with sienes and an otter trawl from several marsh habitats and in the open bay of each estuary. A comparison was made of the species composition and food habits of the bay fauna and the marsh fauna.

a. Collection. Major collections of bay species were made by otter trawl on 2-3 June 1978 in Netarts Bay and on 18 September 1978 in Siletz Bay. Fish were taken by seine in the sedge marsh (18 September

1978) and mature high marsh (1 November 1978 and 12 April 1979), and in the tidal creeks at sites which previously had been extensively sampled for aquatic invertebrates. Also, flooded low marshes (areas 7 and 8) were seined for juvenile salmonids and other species in April 1979. A total of 20 additional seine samples was collected in pan, level marsh, creek, mudflat, and slough habitats.

Only part of the catch was generally retained since the primary objective was to document habitat use according to species and to provide specimens for stomach content analysis. Thus, where large numbers of the same species were caught in a single haul or in several hauls, a subsample of each species representing the size spectrum captured was retained. Fish were preserved in 10 percent buffered seawater formalin in the field. The abdominal cavities of all but very small fish were opened to allow penetration of the preservative. In the laboratory, the fish were transferred to 70 percent isopropanol for storage. All specimens were identified to species and measured for fork length.

b. Stomach content analysis. The stomach contents of 10 to 12 fish from a sample were analyzed. A total of 237 fish stomachs from 27 samples was analyzed. The fish selected approximated the species composition and size distribution of the preserved samples.

Stomach content analysis involved removing the stomach and estimating stomach fullness, digestion state, bolus volume, and volumes and numbers of the different food items. The analysis was made using a binocular dissecting microscope and a grided petri dish. Digestion state of the

bolus was rated on a scale of 0 to 9, based on prey recognizability (i.e., 0 = nothing recognizable; 9 = totally recognizable). The volume (but not number of items) of unrecognizable materials was recorded as a separate item. Prey items were identified according to taxonomic groups used in the invertebrate studies.

RESULTS

1. General.

The structure of the invertebrate and fish communities is first depicted on a taxonomic basis and then on a trophic basis. In both cases, the data are presented in the form of relative abundance. For the trophic interpretation, each invertebrate taxon was assigned to a trophic type (herbivore, detritovore, carnivore, omnivore, scavenger, non-feeder, and unknown). Fish trophic relations are based on the stomach contents data.

Drift net data were omitted from this presentation due to sampling difficultures (Appendix A) and because the aquatic sweep net collections in tidal creeks provide very similar information. Appendices B and C are taxonomic checklists of invertebrates and fish, respectively. Tabular summaries of the data are provided in Appendix D (invertebrate collections), E (fish collections), and F (fish stomach contents).

2. Taxonomic Structure of Invertebrate Communities.

Soil infauna, sampled by medium corer, was dominated by oligochaetes and several dipterous larvae (Fig. 3). Ceratopogonid and chironomid larvae were especially abundant in the low marshes (sand, silt, and

sedge), while mycetophilid and dolichopodid larvae were most abundant in the two high marshes, which had a more diverse dipterous fauna. Certain taxa numerous in the low marshes samples--Acarina, Isopoda, and the amphipod genera, *Anisogammarus* and *Orchestia*--are epifaunal forms which were trapped at the surface by the corer. Another amphipod genus, *Corophium*, lives in tubes both in the substrate and on vegetation, depending on species. The dominant species in the marshes was *C. salmonis*, which is an infaunal animal common in muddy estuarine tidal flats. Its high density in the low silt marsh reflects the fact that the samples were collected near the edge of a prograding marsh where it merges with a tidal flat.

The fauna of low vegetaiton (clip-quadrat samples) included high densities of Acarina in all marshes (Fig. 3). Collembola were abundant only in the high marshes, while Coleoptera and Homoptera occurred in both low and high marshes. The isopod, *Gnorimosphaeroma lutea*, was abundant only in the low silt marsh. The high marsh fauna included four families of Collembola, two of Homoptera, and eight of Coleoptera. Aphididae (Homoptera) and Limnebiidae (Coleoptera) inhabited some of the low marshes.

The invertebrate fauna of the high vegetation sampled by terrestrial sweep net was boradly similar for all five marshes in that Acarina, Homoptera, Diptera, Aranae, and Hymenoptera were abundant in all marshes (Fig. 3). Hemiptera of the low marshes were predominantly saldids, and in the high marshes mirids and pentostomids although these were not abundant. The composition of the Homoptera varied amoung marshes, although Delphacidae was generally abundant. The dipterous fauna tended to be more diverse inthe high marshes; the low

number of taxa in the low sand marsh likely relates to the poor vegetation cover afforded by pickleweed and salt grass.

The fauna of the low sand marsh debris line was composed chiefly of Acarina, Collembola, Amphipoda (*Orchestia traskiana*), and Aranae (Fig. 3). This fauna differs in part from the fauna of the low vegetation and high vegetation habitats of the low sand level marsh, although Acarina and limnebiid beetles were abundant in all three habitats. Collembola (mostly isotomids) were abundant in the debris line, but absent from both high and low vegetation. Debris line dipterans were mostly sphaerocercids, as contrasted with chironomids and ceratopogonids found in the low vegetation, and muscids in the high vegetation.

Faunal composition of the submerged level marsh (sampled by the large enclosure method) was a mixture of aquatic and terrestrial forms (Fig. 3). Dominant groups were Acarina in the low sand and sedge marshes, isopods in the low silt marsh, and dipterous larvae in the immature high marsh. Oligochaetes were moderately abundant in the low silt and sedge marshes, where they were frequently found inside decaying sedge leaves, a condition which made their quantification difficult. Among coleopterans captured from the submerged vegetation of the low marshes were limnebiids, staphylinids, and coccinellids. In the immature high marsh, carabids and hydrophilids were collected. It is interesting that the hydrophilids, which are aquatic, moved into this high marsh during its rare submergence. These animals probably originated in nearby pan or eroded bank habitats. Diptera of the submerged level marsh were primarily larvae psychodids, ceratopogonids, and chironomids, with some variation among marshes. Homoptera, although not abundant in the submerged marshes, was represented by three families,

Cicadellidae, Delphacidae, and Aphididae, with the Delphacidae the most abundant.

Aquatic crustaceans of the submerged level marshes were the amphipods *Corophium* spp., *Anisogammarus confervicolus*, and *Orchestia traskiana*, the isopod *G. lutea*, and the two cumacean genera, *Hemileucon* and *Cumella* (Fig. 3). Of these, *G. lutea* and *A. confervicolus* were especially abundant in the low silt marsh. Dense summer populations of *G. lutea* swarmed in the warm water of shallow depressions between vegetated areas. On the low sand marsh, large numbers of talitrid amphipods migrated upshore ahead of advancing tides, seeking shelter in dead eelgrass and other debris. When this material floated within the large enclosure sampling grid, amphipod and other animal densities measured very high.

Several pans in the high marshes sampled by aquatic sweep net were inhabited by a variety of aquatic forms (Fig. 3). The immature high pan had large numbers of copepods (mostly harpacticpods), the amphipod, *A. confervicolus*, and oligochaetes. The mature high pans also contained amphipods and oligochaetes; corixids, and ephydrid and culicid larvae were also abundant.

Infauna of tidal creeks in the sedge and mature high marshes were similar (Fig. 3). Oligochaetes, polychaetes, and amphipods were the most abundant forms in each creek. Capitellids and anpharetids dominated the polychaete fauna in both creeks, although spirorbids and spionids were also abundant in the mature high creek. Amphipods were mostly *Corophium* and *Anisogammarus conferviculus*, but included some talitrids and *Ampithoe* in the mature high creek. *Macoma balthica*, a small tellinid bivalve, was common in the sedge creek but absent from the mature high creek.

Animals collected in the tidal creeks by aquatic sweep net were a mixture of aquatic and terrestrial animals also collected in large enclosure samples and in creek infauna samples (Fig. 3). Presumably, terrestrial animals in the creek fell into the water or washed in during tidal submergence. Diptera of the two creeks were quite different, being quite diverse in the sedge creek and limited to a few taxa in the mature high creek. This may reflect the comparatively large amounts of filamentous algae occurring in the sedge creek at the time of sampling. The algae appeared to have high densities of dipterous larvae and other taxa capatured by the aquatic sweep net and the corer. The grapsid crab, *Hemigrapsus oregonensis*, was also common in the algae, although it was not quantitatively sampled.

The infauna of the sedge tidal flat was similar in many respects to the infauna of the sedge creek infauna (Fig. 3). The tidal flat is located near the bayward outlet of the creek, and both the creek and the tidal flat have muddy substrates. The tidal flat infauna was relatively poor in Diptera, however, having only low densities of dolichopodid larvae. Other differences included a lower density of a burrowing cnidarian, and the addition of a sacoglossan gastrod, *Alderia*.

The infauna of the sandy tidal flat located below the low sand marsh (Netarts Bay) differed from the infauna of the sedge tidal flat in having a relatively greater abundance of polychaetes (principally *Haploscoloplos*) and an *Eohaustrorius-Paraphoxus* amphipod fauna, in contrast to the *Corophium*-dominated fauna of the sedge mudflat. The decapod shrimp, *Callianassa*, and the bivalve, *Cryptomya californica*, an inhabitant of *Callianassa* burrows, was also present in the sandy tidal flat.

3. Composition of Fish Communities.

Of 26 species of fish captured in seines and trawls, 2 species (staghorn sculpin, *Leptocottus armatus*, and the threespine stickleback, *Gasterosteus aculeatus*) dominated the catches in both high and low marshes (Table 4). The two species were common in creeks, pans, and submerged vegetation at the marsh edge, as well as in non-marsh habitats. However, staghorn sculpin were not captured in low marsh pans. Threespine stickleback captured in marsh habitats were juveniles to adults (12 to 76 millimeters), while staghorn sculpin were juveniles and young adults (17 to 173 millimeters) (Table 5).

Other species in marsh habitats were juvenile surfsmelt (*Hypomesus pretiosus*) and juvenile chum salmon, captured primarily in low level marshes (Tables 4 and 5). The young chum salmon were seined along sparsely vegetated low marshes in both Netarts and Siletz Bays. In Netarts Bay, these salmon are occasionally abundant in the spring because of natural reproduction and the release of hatchery-reared juveniles. Those in Siletz Bay apparently result from a small natural run.

The most abundant fish species in the slough adjoining the sedge marsh were the shiner surfperch (*Cymatogasta aggregata*) and the threespine stickleback (Table 4). Nine other species were captured although in much lower numbers. These species included staghorn sculpin, northern anchovie (*Engraulis mordax*), starry flounder (*Platichthyes stellatus*), and juvenile chinook salmon.

The largest variety of fish occurred in the bay channel, where species found in marsh habitats along with several juvenile marine species were collected (Tables 4 and 5). The most abundant marine

Table 4. Occurrence of fish species in several marsh and nonmarsh habitats.[1]

FISH	High Marsh		Low Marsh[2]			Other		
	Pan	Creek	Level	Pan	Creek	Slough	Tidal flat	Bay channel
Number of Samples	3	5	5	2	8	4	4	11
Pacific sandlance *(Ammodytes hexapterus)*								/ / / /
Topsmelt *(Atherinops affinis)*					/ / / /			
Speckled sanddab *(Citharichthys stigmaeus)*								XXXXXXXX
Staghorn sculpin *(Leptocottus armatus)*	XXXXXXXX	XXXXXXXX	XXXXXXXX		XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX
Buffalo sculpin *(Enophrys bison)*								/ / / /
Cabezon *(Scorpaenichthys marmoratus)*								/ / / /
Prickly sculpin *(Cottus asper)*					/ / / /	/ / / /		
Coastal sculpin *(Cottus aleuticus)*					/ / / /			
Shiner surfperch *(Cymatogaster aggregata)*			/ / / /		/ / / /	XXXXXXXX	XXXXXXXX	
White surfperch *(Phanerodon furcatus)*						/ / / /		
Northern anchovie *(Engraulis mordax)*						/ / / /		
Pacific tomcod *(Microgadus proximus)*						/ / / /		
Tubesnout *(Aulorhynchus flavidus)*								/ / / /
Threespine stickleback *(Gasterosteus aculeatus)*	XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX	/ / / /	/ / / /
Lingcod *(Ophiodon elongatus)*								XXXXXXXX
Kelp greenling *(Hexagrammos decagrammus)*								XXXXXXXX
Surf smelt *(Hypomesus pretiosus)*		/ / / /	XXXXXXXX		/ / / /	XXXXXXXX	/ / / /	/ / / /
Saddleback gunnel *(Pholis ornata)*						/ / / /	/ / / /	/ / / /
Starry flounder *(Platichthys stellatus)*			/ / / /			/ / / /	XXXXXXXX	/ / / /
English sole *(Parophrys vetulus)*							/ / / /	XXXXXXXX
Sand sole *(Psettichthys melanostictus)*							/ / / /	/ / / /
Chum salmon *(Oncorhynchus keta)*		/ / / /	XXXXXXXX			/ / / /		
Chinook salmon *(Oncorhynchus tshawytscha)*						/ / / /		/ / / /
Steelhead trout *(Salmo gairdnerii)*						/ / / /		
Rockfish spp. *(Sebastes spp.)*								/ / / /
Snake prickleback *(Lumpenus sagitta)*								/ / / /
Bay pipefish *(Syngnathus leptorhynchus)*								/ / / /

[1]Results are based on seine samples (most habitats) and otter trawl samples (bay channel) collected on several dates in the two bays; XXX=abundant, ///=present.

[2]Low marsh refers to low sand, low silt, and sedge marshes.

Table 5. Size (fork length in mm) of fish species collected in several marsh and nonmarsh habitats.[1]

SPECIES	High Marsh		Low Marsh		
	Pan	Creek	Level	Pan	Creek
Pacific sandlance (*Ammodytes hexapterus*)					
Topsmelt (*Atherinops affinis*)					38:2(32-44)
Speckled sanddab (*Citharichthys stigmaeus*)	3 4 5				
Staghorn sculpin (*Leptocottus armatus*)	56:29(44-76)	49:88(35-82)	38:115(18-67)		44:97(17-124)
Buffalo sculpin (*Enophrys bison*)					
Cabezon (*Scorpaenichthys marmoratus*)					
Prickly sculpin (*Cottus asper*)					36:4(34-41)
Coastal sculpin (*Cottus aleuticus*)					57:1(57)
Shiner surfperch (*Cymatogaster aggregata*)			75:1(75)		72:1(72)
White surfperch (*Phanerodon furcatus*)					
Northern anchovie (*Engraulis mordax*)					
Pacific tomcod (*Microgadus proximus*)					
Tubesnout (*Aulorhynchus flavidus*)					
Threespine stickleback (*Gasterosteus aculeatus*)	41:146(31-62)	39:216(22-58)	41:88(30-60)	22:46(12-33)	30:501(20-76)
Longcod (*Ophiodon elongatus*)					
Kelp greenling (*Hexagrammos decagrammus*)					
Surf smelt (*Hypomesus pretiosus*)		42:1(42)	53:97(40-64)		
Saddleback gunnel (*Pholis ornata*)					
Starry flounder (*Platichthys stellatus*)					
English sole (*Parophrys vetulus*)					
Sand sole (*Psettichthys melanostictus*)					
Chum salmon (*Oncorhynchus keta*)		39:1(39)	44:57(36-66)		
Chinook salmon (*Oncorhynchus tshawytscha*)					
Steelhead trout (*Salmo gairdnerii*)					
Rockfish spp. (*Sebastes spp.*)					
Snake prickleback (*Lumpenus sagitta*)					
Bay pipefish (*Syngnathus leptorhynchus*)					

SPECIES	Other		
	Slough	Tidal flat	Bay Channel
Pacific sandlance (*Ammodytes hexapterus*)			74:8(61-85)
Topsmelt (*Atherinops affinis*)			
Speckled sanddab (*Citharichthys stigmaeus*)			57:63(28-115)
Staghorn sculpin (*Leptocottus armatus*)	57:59(28-173)	90:16(36-193)	73:60(37-171)
Buffalo sculpin (*Enophrys bison*)			82:6(34-214)
Cabezon (*Scorpaenichthys marmoratus*)			53:5(46-66)
Prickly sculpin (*Cottus asper*)	142:1(142)		
Coastal sculpin (*Cottus aleuticus*)			
Shiner surfperch (*Cymatogaster aggregata*)	82:438(50-154)	35:77(11-119)	68:1(68)
White surfperch (*Phanerodon furcatus*)	76:1(76)		
Northern anchovie (*Engraulis mordax*)	83:4(73-110)		
Pacific tomcod (*Microgadus proximus*)	79:1(79)		
Tubesnout (*Aulorhynchus flavidus*)			100:3(75-139)
Threespine stickleback (*Gasterosteus aculeatus*)	35:45(25-60)	67:4(60-73)	50:4(32-59)
Longcod (*Ophiodon elongatus*)			96:34(72-120)
Kelp greenling (*Hexagrammos decagrammus*)			67:23(59-81)
Surf smelt (*Hypomesus pretiosus*)	69:30(34-172)	39:4(36-42)	75:1(75)
Saddleback gunnel (*Pholis ornata*)	94:2(80-107)	92:9(77-128)	74:11(62-129)
Starry flounder (*Platichthys stellatus*)	152:6(97-228)	133:27(75-243)	177:17(70-425)
English sole (*Parophrys vetulus*)		56:7(33-124)	37:340(20-127)
Sand sole (*Psettichthys melanostictus*)		100:1(100)	105:5(97-127)
Chum salmon (*Oncorhynchus keta*)			
Chinook salmon (*Oncorhynchus tshawytscha*)	95:14(62-105)		90:1(90)
Steelhead trout (*Salmo gairdnerii*)	180:1(180)		
Rockfish spp. (*Sebastes spp.*)			42:1(42)
Snake prickleback (*Lumpenus sagitta*)			120:2(74-166)
Bay pipefish (*Syngnathus leptorhynchus*)			220.5(156-245)

[1] Results are based on seine samples (most habitats) and otter trawl samples (bay channel and tidal flat) collected on several dates in the two bays.

[2] Low marsh refers to low sand, low silt, and sedge marshes.

[3] Mean.

[4] Sample size.

[5] Range.

species in Netarts Bay was juvenile English sole (*Parophrys vetulus*), which invade northwest estuaries in large numbers during the spring.

4. Trophic Structure of Invertebrate Communities.

The trophic structure of the major terrestrial and aquatic marsh communities is presented in Figure 4. Data from large enclosure and aquatic sweep net collections have been omitted because these collections include both submerged terrestrial and aquatic species. An analysis of the trophic structure of such assemblages would be misleading, since they do not represent communites as such.

The major feature of Figure 4 is the predominance of detritovores and scavengers in most of the communities. Oligochaetes, amphipods (*Corophium*) and Acarina were the principal detritovores of the soil communities, while Acarina were the most abundant detritovores in low vegetation, high vegetation, and debris line communities. Herbivore populations (mostly homopterans) were abundant in the high vegetation especially in high marshes, where their densities exceeded those of the detrivores. Scavengers were numerous in the soil marsh (ceratopogonid and chironomid larvae), the low vegetation of the low marsh (isopods, amphipods, limnebiid beetles) and in the debris line (amphipods, limnebiids).

Carnivores generally comprised a small fraction of the animal life in soil and low vegetation habitats. However, dolichopodid (Diptera) larvae were abundant in high marsh soils, and also occurred in low marsh soils. The carnivore populations of low vegetation were composed primarily of Araneae and staphylinid beetles. High vegetation carnivores tended to be more numerous, and included several types of

dipterous adults (Dolichopordidae, Ceratopogonidae, and Muscidae) and Araneae. The debris line carnivores were Araneae and Saldidae (Hemiptera) which occurred in moderate abundance.

The trophic structure of infaunal communities of the tidal creeks and tidal flats was heavily weighted to the detrivore component (Fig. 4). In all creek and tidal flat communities. oligochaetes and capitellid polychaetes were among the dominant detritovores. Other detritovores were *Haploscoloplos* (Polychaeta) and *Corophium* (Amphipoda). Common carnivores were the Polychaete *Eteone* and a small cnidarian polyp. Although algae covered much of the sedge creek and tidal flat substrate surface at the time of sampling, macrofaunal herbivores were rare.

5. Fish Food Habits.

Fish stomach contents data are summarized in Figure 5, which combines data for all sampling sites and dates for each habitat.

Staghorn sculpin, threespine stickleback, and juvenile chum salmon captured over submerged level marshes consumed a variety of predominantly aquatic animals, including amphipods (*Corophium* and *Anisogammarus*), harpacticoid copepods, cumaceans (*Hemileucon*), oligochaetes, and polychaetes (Fig. 5). The diet is diverse partly because data from several samples have been combined. Terrestrial prey were not eaten except by the chum salmon, which ate small amounts of adult insects and spiders. They also consumed various dipterous larvae and pupae, especially psychodids, found in marsh habitats. In the chum salmon's stomach, insect foods often formed a surface layer over a ball of flatfish larvae, indicating that the salmon fed subtidally and then

fed along the shoreline. The most abundant food organism in the salmon was *Hemileucon*, which comprised 39 percent of the stomach content. Harpacticoids were abundant in the stomachs of staghorn sculpin and stickleback but not in the chum salmon. Starry flounder mostly ate decapod larvae, adult *Callianassa*, and amphipods. Surf smelt mostly consumed *Hemileucon*.

In marsh pans, staghorn sculpin consumed mostly amphipods, aquatic isopods, and small fish, while threespine stickleback ate a large variety of animals, including calaniod and harpacticoid copepods, and ceratopogonid larvae (Fig. 5). Very little of the diet of the two fish could be considered terrestrial, although some of the dipterous larvae live in marsh litter or soils.

Staghorn sculpin and threespine stickleback captrued in tidal creeks had diets very similar to fish captured in pans (Fig. 5). Sculpins concentrated on amphipods and isopods, while the stickleback diet included a total of 40 prey types dominated by harpacticoids and ceratopogonid larvae.

Several species of fish captured in the slough near the sedge marsh consumed large quantities of amphipods (Fig. 5). Shiner surf-perch supplemented this food with the gastropod *Alderia* and polychaetes. Ampharetid polychaetes (very likely *Hobsonia florida*) were eaten by both the perch and the starry flounder.

Young staghorn sculpin and English sole captured on the tidal flat below the low sand marsh ate tanaids, amphipods, harpacticoids, and polychaetes (Fig. 5). These invertebrates are characteristic forms of tidal flat substrates. There is little indication of use of marsh foods by the sculpin or sole.

Among the dozen fish species examined which were captured in bay channels, the dominant foods were decapods (especially *Crangon*), polychaetes, and a variety of amphipods, fish, and other aquatic animals (Fig. 5). Terrestrial foods were of minor occurrence.

DISCUSSION

Marsh studies, especially those of vegetation, have concentrated on level marsh habitats due to their prevalence and importance as producers of organic detritus. However, nutrient transfer to aquatic food chains involves both bay detritus transport and secondary production by marsh invertebrates in pans, tidal creeks, and adjoining tidal flats. This study determined community composition, trophic structure, and food chain relations for fauna in both level marsh and aquatic habitats in two Oregon estuaries.

Broadly viewed, the study revealed similarities between the terrestrial invertebrate communities of the Oregon marshes and those studied elsewhere on the Pacific and Atlantic coasts. The full extent of this similarity can not be assessed since the level of identification varied among the studies. The Oregon marsh study did not study seasonality or identify immature insects collected from exposed vegetation. However, the data provide a sufficiently accurate picture of community structure and aquatic food chains for comparison with other marsh communities. In these comparisons, collection method is discussed in relation to the portion of the community represented.

The invertebrate fauna of the level marsh, debris line, pan, tidal creek, and tidal flat habitats are summarized in Tables 6 and 7. The

tables include animals captured by all sampling methods used in each of these habitats. Taxonomic diversity of the level marsh habits was highest in the high level marsh, slightly lower in the low level marsh, and lowest in the debris line (Table 6). However, the habitats share several taxa. A similar overlap occurred in fauna of aquatic habitats (Table 7). Composition of the tidal creek infauna is similar to that of the muddy tidal flat. Taxa from this community also appear in tidal pans. It is likely that more extensive sampling of pans, especially in the low marsh, would reveal greater similarities of pan and creek faunas than indicated here.

The fauna of the marsh soils, dominated by oligochaetes and dipterous larvae (Fig. 3), is not diverse partly because samples were collected during the winter and early spring when some insect species presumably rest in the egg state. The high abundance of oligochaetes and near absence of polychaetes contrasts with the results of Cammen (1976) who studied the macroinvertebrates of natural and planted salt marshes in North Carolina. In the natural marshes and at one bare soil site, polychaetes dominated (by biomass), while insect larvae and amphipods were dominant in some planted and bare soil sites. Composition of the marsh and creek polychaete fauna was similar. Among the several dipterous families Cammen lists, only Dolichopodae was abundant in the Oregon marsh soils. High densities of Ceratopogonidae and Chironomidae occurred in the Oregon marshes and were sparse or absent from the North Carolina marshes. Both the North Carolina and Oregon lists are relatively short in comparison to Wall's (1973) list of taxa for Cape Cod marshes. Thus more extensive collections might show greater similarity between Atlantic and Pacific coast soil infauna.

Table 6. Invertebrates characteristic of terrestrial habitats.[1]

TAXON	HABITAT: High Level Marsh	Low Level Marsh	Debris Line
Cnidaria			
Halacampa (?) sp.		A	
Turbellaria	A		
Nematoda	A	A	
Polychaeta			
Capitellidae		A	
Hobsonia florida		A	
Oligochaeta	A	A	
Aranae	A	A	A
Acarina	A	A	A
Cirripedia			
Balanidae		A	
Cumacea			
Cumella sp.		A	
Isopoda			
Gnorimosphaeroma lutea		A	
Ligidium gracilis	A		
Porcellio scaber	A		
Amphipoda			
Ampithoe sp.		A	
Corophium sp.		A	
Anisogammarus confervicolus		A	
Orchestia traskiana	A	A	A
Collembola			
Entomobryidae	A		
Isotomidae	A		A
Onychiuridae	A		A
Poduridae	A		
Sminthuridae	A		A
Diplura		A	
Orthoptera	A		
Thysanoptera	A	A	A
Hemiptera			
Saldidae		A,N	A,N
Lygaeidae		A	
Miridae	A	A	
Pentatomidae	A	A	
Homoptera			
Cercopidae	A	A	
Cicadellidae	A	A	
Delphacidae	A	A	
Aphididae	A	A	

TAXON	HABITAT: High Level Marsh	Low Level Marsh	Debris Line
Coleoptera			
Carabidae	A	A	A
Limnebiidae	A	A	A
Staphylinidae	A	A	A
Pselaphidae	A		
Ptiliidae	A		
Heteroceridae	A		
Coccinellidae	A	A	
Corylophidae	A		
Chrysomelidae	A		
Trichoptera			
Limnephilidae		L	
Lepidoptera	A		A
Pyralidae		L	
Diptera			
Tipulidae	L	A,L	
Psychodidae	A	A,L	
Ceratopongidae	A,L	A,L	
Chironomidae	A,L	A,L	A
Culicidae	A	A	
Mycetophilidae	L		
Scatopsidae	A		
Sciaridae	A	A	A
Cecidomyiidae			A
Dolichopodidae	A,L	A,L	
Longchopteridae	A		
Phoridae	A		
Sepsidae	A		
Sciomyzidae	A		
Sphaeroceridae	A	A	A
Ephydridae	A	A	
Chloropidae	A	A	
Muscidae	A	A,L	
Hymenoptera	A	A	A
Chilopoda	A		

[1]A = adults, L = larvae, N = nymphs

Table 7. Invertebrates characteristic of aquatic habitats.[1]

TAXON	HABITAT: Pan	Tidal Creek	Tidal Flat: Sandy	Tidal Flat: Muddy	TAXON	HABITAT: Pan	Tidal Creek	Tidal Flat: Sandy	Tidal Flat: Muddy
Cnidaria		A		A	Tanaidacea				
Nemertea		A	A		*Pancolus* sp.		A	A	
Nematoda		A	A	A	*Leptochelia* sp.		A	A	
Polychaeta					Isopoda				
Haploscoloplos sp.			A		*Gnorimosphaeroma lutea*	A	A		
Polydora sp.		A			*Idotea resecata*		A		
Pseudopolydora sp.		A	A	A	Amphipoda				
Pygospio sp.		A	A	A	*Ampithoe* sp.	A	A		
Streblospio sp.		A		A	*Corophium* sp.	A	A		A
Capitellidae	A	A	A	A	*Anisogammarus confervicolus*	A	A		A
Neanthes limnicola		A			*Eohaustorius* sp.			A	
Eteone sp.		A	A	A	*Paraphoxus* sp.			A	
Arabellidae			A		Talitridae		A		A
Hobsonia florida	A	A		A	Decapoda				
Spirorbidae		A			*Callianassa* sp.			A	
Oligochaeta	A	A	A	A	*Hemigrapsus oregonensis*		A		A
Gastropoda					Collembola				
Alderia (?) sp.		A		A	Isotomidae			A	
Bivalvia					Odonata	N			
Cryptomya californica			A		Hemiptera				
Macoma balthica		A		A	Saldidae		A,N		
Aranae		A			Corixidae	A	A		
Acarina		A			Homoptera				
Ostracoda		A	A		Aphididae		A	A	
Copepoda					Coleoptera				
Calanoida	A	A			Hydrophilidae	A			
Cyclopoida		A	A		Limnebiidae	A			
Harpacticoida	A	A		A	Staphylinidae		A		
Cirripedia					Trichoptera				
Balanidae		A			Limnephilidae	L			
Cumacea					Diptera				
Cumella sp.	A	A		A	Tipulidae		A,L		
Hemileucon sp.		A		A	Psychodidae		A,L		
					Ceratopongidae	L	A,L	A	
					Chironomidae	L	A,L		
					Culicidae	L	A		
					Tabanidae	L			
					Dolichopodidae	L	A,L		L
					Ephydridae	L	A		
					Muscidae	L	L		

[1]A = adult, L = larvae, N = nymphs

The low vegetation was inhabited by dense populations of Acarina and, in high marshes, moderate populations of Collembola (Fig. 3). Acarina, Homoptera and Diptera were the most abundant invertebrates in the upper vegetation. Lane (1969) also found that the dominant insect orders were Homoptera and Diptera in the San Francisco Bay marsh he studied. He collected by sweep net, aerial net, and blacklight so that his collections were most similar to the sweep net collections of upper vegetation made here. Cameron (1972), who also studied a San Francisco Bay marsh, used a clip-quadrat method which harvested animals from the total above-ground plant. Thus his methods approximate a combination of the sweep net and clip-quadrat methods used in Siletz and Netarts Bays. He found that the orders Diptera, Coleoptera, and Hymenoptera contributed the most species, but that a pseudococcid homopteran was the most abundant species throughout the year. In Lane's study, the dominant homopterans were delphacids and psyllids. In the Oregon marshes, aphidids, delphacids, and cicadellids were variously the most abundant homopterans, depending on marsh and collection method.

In the Oregon marshes, adult dipterans were almost absent in the lower vegetation, and both abundant and varied in the upper vegetation, where ceratopognomids, dolichopodids and muscids were common (Fig. 3). Dominant dipterans in Lane's (1969) study were Chloropidae, Ephydridae, and Chironomidae. Cameron (1972) does not provide abundance information for Diptera.

On the Atlantic coast, Davis and Grey (1966) collected marsh insects with a sweep net. The dominant orders there were also Homoptera and Diptera. The most abundant homopterans were cicadellids and delphacids and the most abundant dipterans were chloropids, dolichopodids, and ephydrids.

Collembolans of the Oregon level marshes were concentrated in the lower vegetation of high marshes (Fig. 3). The most abundant family, Isotomidae, also occurred in Lane's (1969) core samples, but were not abundant in his other samples. Davis and Gray (1966) do not list Collembola as abundant. In Cameron's (1972) study, a podurid was extremely abundant in *Spartina foliosa* (a low marsh), especially after high tides. Paviour-Smith (1956) indicates that an isotomid was very abundant in the high marsh zone of a New Zealand salt meadow which she sampled using a cylindrical enclosure. She points out that collembolan densities can be erratic due to rapid summer reproductive cycles and the animal's habit of floating on incoming tides and then remaining in dense colonies where the dropping water leaves them.

The coleopterous families Coccinellidae and Chrysomellidae were collected in the Oregon marshes (Fig. 3), as well as in the Atlantic coast marsh studied by Davis and Gray (1972), and in San Francisco marshes (Lane, 1979). Paviour-Smith (1956) does not list these families. Several other families (e.g., Carabidae, Staphylinidae, Curculionidae) are varioulsy mentioned in these studies, but there seems no consistent pattern to their occurrence. Limnebiidae, abundant in the low sand marsh of Netarts Bay, is not mentioned in the other studies.

Of four terrestrial families of Hemiptera found in the Oregon marshes (Fig. 3), Lygaeidae, Miridae, and Pentatomidae, are described by Davis and Gray (1966) as the most abundant hemipterans in North Carolina marshes. The remaining Oregon family, Saldidae, is listed by Lane (1969) along with Miridae, Pentatomidae and two other families not found in the Oregon marshes as occurring the San Francisco marsh.

The order Hymenoptera was relatively low in abundance in the low

marshes and of moderate abundance in the high marshes (Fig. 3). Few ants (Formicidae) were captured, even in the high marshes. Since the sampling areas were small, ant colonies could have been missed. The majority of the hymenopterans collected were wasps and similar flying forms, which were not further identified. Davis and Gray (1966) stated that all of the common Hymenoptera in the North Carolina marsh were ants, while Lane (1969) reported that although an ant species was the most prevalent soil insect in his study, several wasp species also were collected.

Thysanoptera were common only in the high marshes (high vegetation) of the present study (Fig. 3). This order was not important in the studies of Lane (1969), Cameron (1972), Davis and Gray (1966), or Paviour-Smith (1956).

Other terrestrial insect orders collected in the Oregon marshes were Lipidoptera, Diplura, and Orthoptera (Fig. 3). These were all of low occurrence in the San Francisco marshes (Cameron, 1972; Lane, 1969). However, Davis and Gray (1966), Teal (1962), and Marples (1966) indicate that grasshoppers (*Orchelimum*) may be common and trophically important in Atlantic coast marshes. The scarcity of orthopterans in Pacific coast collections may be both a matter of chance and the animal's ability to escape collection. However, large populations were never observed in the Oregon marshes when collections were being made.

The high Acarina populations found in the Oregon marshes (Fig. 3) cannot be well compared to other marshes because these animals usually have received little attention elsewhere. However, Paviour-Smith's (1956) kite diagrams show a strong zonation of mites by family, and indicate that highest population density occurred in higher marshes.

In contrast, very high densities of mites occurred in Oregon low marshes.

Araneae populations were relatively low in abundance in the low vegetation and, excepting the low sand marsh, moderate in abundance in the upper vegetation (Fig. 3). The present study, like most, has given little attention to the composition of the Araneae community. Barnes (1953), however, provides a thorough description of maritime spider communities in North Carolina.

A striking feature of the Oregon marsh collections is the scarcity of gastropods, especially in light of MacDonald's (1977) observation that *Assimerea translucens* is ubiquitous across Pacific coast marshes, and that gastropod densities often reach several thousand per square meter. Gastropods are common members of level marsh faunas on the Atlantic coast (Nixon and Oviatt, 1973; Teal, 1962). It seems unlikely that these animals were common in the areas investigated considering that several sites were sampled and with varying techniques. Paviour-Smith (1953) apparently found few or no gastropods in her study.

The fauna of the debris line (Fig. 3) on the low sand marsh is an interesting blend of taxa found in other habitats. Like other level marsh habitats, the debris line contained large numbers of Acarina and low numbers of Araneae. The collembolan family Isotomidae was abundant, as in the high marsh low vegetation; suggesting that the debris line of the low sand marsh provides a rich, if unstable, habitat comparable to the accumulated litter found in high marshes. Other debris line taxa were the amphipod *Orchestia traskiana*, found in all the marshes, Saldidae (Hemiptera), found principally in the low marshes, and Limnebiidae (Coleoptera) found mostly in the low sand marsh. Dipterous

adults were not abundant; most were spaerocerids, which occurred in both high and low marshes.

Several terrestrial taxa were collected from inundated vegetation during high tide (Fig. 3). Adult Coleoptera, Homoptera, Hemiptera, and Collembola appeared in many of the submerged marsh samples, and were especially well represented in the immature high marsh samples, where several beetle families were collected. Limnebiid beetles were abundant in the submerged low sand marsh as they are during tidal exposure. Adult Diptera were rare except in the low sand marsh. The data suggest that more active flying animals (Diptera) are less apt to be covered than animals less likely to fly (Coleoptera, Homoptera, Collembola, Hemiptera). Opinions differ as to the ability of terrestrial insects in salt marshes to escape submergence. This is reviewed by Cameron (1976) who tested the response of adult insects to submergence by collecting them from several strata of salt marsh plants during different phases of exposure and submergence. He detected no differences in these animal communities that would suggest exodus or upward migration on the plants. He does not provide the taxonomic composition for his samples, but since he used the clip-quadrant sampling technique, it seems likely that adult dipterans were not adequately sampled and that he studied the less active orders of insects such as were found on the submerged vegetation in the Oregon marshes.

The infauna of pans and tidal creeks includes estuarine animals (e.g., Polychaeta, Amphipoda, Tanaidacea, Isopoda) and animals of terrestrial origin (dipterous larvae) (Table 7). Many of the taxa found in the Oregon tidal creeks also occur in Atlantic coast tidal creeks or embayments. These include *Neanthes, Streblospio, Polydora,*

Hobsonia, Capitellidae, *Eteone*, *Corophium*, *Orchestia*, Dolichopodidae, Ephydridae, and Muscidae (Cammen, 1976; Nixon and Oviatt, 1973). The polychaete, *Hobsonia florida*, is common on the east coast and is apparently widespread in northwest estuaries, where it has only recently been identified (Banse, 1979). The Atlantic coast tidal creeks apparently are inhabited by a greater variety of decapods, including fiddler crabs (*Uca*), the green crab (*Carcinidea macnas*), and the blue crab (*Callinectes sapidus*) (Nixon and Oviatt, 1973). Only one decapod, *Hemigrapsus oregonensis*, was found in the sedge and mature high tidal creeks, although it is possible that such estuarine decapods as *Crangon*, *Callianassa*, and *Cancer* occur in other Oregon tidal creeks. Molluscan diversity was also low in the Oregon tidal creeks studied. Only two taxa were abundant, *Alderia* and *Macoma balthica*. MacDonald (1969) found *Macoma inconspicua* (considered here to be synonomous with *M. balthica*) and *Mya arenaria* in a marsh tidal creek of Coos Bay, a southern Oregon estuary. In Grays Harbour, Washington, he found these species plus *Macoma nasuta* and *Cryptomya californica*. All four species are common in Northwest estuaries. There was a tendancy for fewer species of tidal creek molluscs to occur in the Oregonian Province than in the Californian Province. These tidal creek molluscs are not mentioned in Cammen (1976) or Nixon and Oviatt (1973), although both *Macoma balthica* and *Mya arenaria* occur in Atlantic coast estuaries.

Few fish species were collected in the marsh habitats. Threespine stickleback, staghorn sculpin, and much fewer numbers of prickly sculpin (*Cottus asper*), coastal sculpin (*C. aleuticus*), shiner surfperch, surfsmelt, and chum salmon were found in the tidal creeks. In tidal creeks of marshes in the Fraser river estuary, Dunford (1975) collected

juvenile chum and chinook salmon, threespine stickleback, and small numbers of prickly sculpin. In slough habitats he collected a much greater variety of fish, including juvenile salmon, starry flounder, threespine stickleback, prickly sculpin, staghorn sculpin, peamouth (*Mylocheilus caurinus*), squawfish (*Ptychocheilus oregonensis*), and several species of the minnow family (*Cyprinidae*). Thus, while the two studies agree that fish diversity is higher in sloughs than in tidal creeks, species composition tended toward freshwater species in the Fraser River sloughs and marine species in the Siletz River slough.

Daiber (1977) working on Delaware marshes, and Slenker and Dean (1979), working in Sough Carolina marshes, observed high utilization of Atlantic coast tidal creeks by larval and juvenile fishes. Their results emphasize the high diel and seasonal variability in catch composition. Also, while more species used creeks in the lower more marine parts of the estuary, variation in use from creek to creek was high (Daiber, 1977). A total of 22 species and 16 families of larval, juvenile, and adult fish used the South Carolina creeks. Many of these are marine species.

Based on Dunford's (1975) study and the Oregon study, the fish fauna of marsh tidal creeks in northwest estuaries is low in diversity and does not include large or diverse larval and juvenile populations. Several explanations are possible: (1) The studies did not adequately represent the fauna studied, with may vary greatly seasonally, daily, and from creek to creek; (2) The low salinity regime of the estuaries studied prevented the influx of marine species; and (3) The relatively simple and spatially restricted nature of Pacific coast marshes has not encouraged extensive exploitation of the tidal creek habitats by

juveniles of marine species such as has occurred on the Atlantic coast.

The trophic structure of invertebrate communities in the Oregon marshes is strongly oriented to the detritus food chain. In the marsh soil, low vegetation, debris line, tidal creek substrate, and tidal flat habitats, numbers of detritovores and scavengers far exceeded the number of herbivores (Fig. 4). Only the upper vegetation sampled by sweepnet contained a large proportion of herbivores, and this proportion increased from low marsh to high marsh. Herbivores were thus concentrated on growing plant tissues where their food resources are greatest, while detritovores and scavengers were abundant in surface debris and in the soil where their food accumulates. Overall animal abundance appears to favor detritovores and scavengers and thus the detritus food chain. This is consistent with the observation that energy flow in salt marshes is greater through detritus than through grazing food chains (Teal, 1962), and that marsh plants produce surpluses of organics that are both incorporated into marsh food chains and exported to other estuarine food chains (Cameron, 1972; Eilers, 1979; Teal, 1962).

As in other studies (Cameron, 1972; Davis and Gray, 1966) spiders were found to be the dominant invertebrate carnivore in terrestrial food chains.

Dunford's (1975) study of fish communities in slough and tidal creek habitats of the Fraser river estuary provides comparative information to the Oregon study. Juvenile chum, chinook, and sockeye (*Oncorhynchus keta*) salmon which he collected in these habitats consumed mostly aquatic foods. However, there appeared to be more ter-

restrial animals consumed in the tidal creeks than in sloughs, and more of these animals were consumed in late May than in April. The principal prey organisms were Homoptera and Collembola, although other terrestrial animals were eaten. In some incidences, terrestrial animals accounted for more than 40% of the prey biomass. The implication is that the young salmon fed opportunistically on available prey, which included increasing amounts of terrestrial insects as populations increased during early spring. More insects presumably wash into the marsh-lined tidal creeks than into sloughs. In other studies of Northwest estuaties, juvenile salmon consumed predominantly benthic amphipods (Cliff and Stockner, 1973), harpacticoids (Healey, 1979), and a mixture of amphipods, isopods, dipterous larvae, and copepods (Mason, 1974). The diurnal variation in juvenile chum and coho (*O. kisutch*) salmon foods observed by Mason in a small coastal creek is an excellent illustration of the dietary flexibility exhibited by young salmonids.

Other fish species in Dunford's (1975) study consumed mostly aquatic foods. The results for the slough habitat were: (1) longfin smelt (*Spirinchus thaleichthys*)--mysids; (2) peamouth--cladorera and ostracods; (3) starry flounder--benthic amphipods and isopods, oligochaetes, polychaetes, and chironomid larvae; (4) prickly sculpin--benthic isopods, chirononoid and tabanid larvae, and benthic amphipods; (5) staghorn sculpin--benthic amphipods and isopods, and juvenile salmon; and (6) threespine stickleback--chironononid larvae, oligochaetes, benthic amphipods, tabanid larvae, copepods, cladocerans, and terrestrial insects. In the tidal creek, threespine stickleback ate copepods and amphipods, and prickly sculpin ate mostly benthic isopods and amphipods.

In Siletz and Netarts Bays, terrestrial invertebrates were consumed in small amounts by fish collected in marsh habitats, in an adjoining slough, and in bay channels. Rather, amphipods, isopods, tanaids, polychaetes, cumaceans, copepods, dipterous larvae and pupae, and fish were variously dominant food items according to collection site and species examined. Thus, it appears that energy flows into the aquatic communities primarily through the detrital pathway, where it is augmented by inputs from benthic and plantonic primary producers. This conslusion is consistent with the results of Teal (1962), Odum and Heald (1975) and similar studies of estuarine food chains.

The information on animal communities and food chain relations supplied in this report provide a basis for establishing guidelines for dredging and other activities, either conducted or monitored by the Corps of Engineers, which may affect Oregon marshlands. Supporting information is found principally in Jefferson (1974), Eilers (1979), MacDonald (1969), and EPA studies yet to be published (H. Kibby, personal communication, 1979).

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APPENDIX A

CRITIQUE OF METHODS

Travel among the study areas was time-consuming and the number of habitats under study was large. These factors combined with weather and tidal patterns to prevent an adequate study of seasonality. Truly adequate study of faunal seasonality requires site-intensive study with summer sampling at one or two week intervals, a schedule beyond the resources of this study. In retrospect, effort should have been concentrated in fewer visits so that the survey aspects could have been emphasized and thus provide a more evenly distributed data base covering the various habitats.

Of the sampling methods used, only the corer samples provided truly quantitative estimates of animal abundance. The enclosure and clip-quadrat samples were semiquantitative; terrestrial sweep net, drift net, seine, and aquatic sweep net samples provided estimates of relative abundance. Because of these varying characteristics, comparisons among habitats and samplers have necessarily emphasized relative rather than absolute abundance. The large enclosure method could be made more quantitative by using a device which severs the enclosed vegetation, which could then be rinsed in a dilute formalin solution to remove attached animal life. This method, as with the one used here, does not account for organisms such as oligochaetes and insects which live within living and dead plant tissues and are likely important factors in detrital and grazing food chains. The enclosure apparently could be smaller than the 1 m diameter used, since sample counts in some cases exceeded several thousand for dominant species. However, this decision should consider the fact that sample counts varied greatly

according to season and site.

Based on the low sample counts obtained for level marsh infauna, a larger sampler than the 9.8-centimeter diameter corer used would be desirable, although core depths apparently can be limited to about 5 centimeters. This assumes first that the study of this fauna is warrented, and second that an efficient method for separating animals from the soil is available. The silty soils of Siletz Bay were compacted and root-bound and thus resistant to simple methods of animal extraction such as provided by the Berlese funnel. The mostly sandy and peaty nature of soils at Netarts study sites likely would have allowed use of the Berlese funnel, although such use would have created differences of methodology between the two bays. Other methods tend to be time-consuming, arduous, or selective for certain taxa, and also may require special washing racks (Edwards, Dukes, and Axtell, 1974; Kline, Dukes, and Axtell, 1975).

Measurements of invertebrate drift in tidal channels were non-quantitative principally because water speeds were too low to operate the net flow meter (General Oceanics Model 2030). Use of a more sensitive meter or direct measurement of water flow rate appears necessary if drift is to be quantified. Quantification of fish populations in tidal creeks apparently can be approached through use of nets described by Shenker and Dean (1979).

APPENDIX B TAXONOMIC LIST OF INVERTEBRATES

Phylum Protozoa
    Subphylum Sarcomastigophora
        Class Rhizopodea
            Order Foraminifera
Phylum Cnidaria
        Class Anthozoa
            Subclass Zoantharia
                Order Actinaria
                    Halacampa (?) sp.
Phylum Platyhelminthes
        Class Turbellaria
        Class Trematoda
Phylum Nemertea
Phylum Nematoda
Phylum Annelida
        Class Polychaeta
            Order Orbiniida
                Family Orbiniidae
                    Haploscoloplos sp.
            Order Spinoida
                Family Spionidae
                    Polydora sp.
                    Pseudopolydora sp.
                    Pygospio sp.
                    Streblospio sp.
            Order Capitellida
                Family Capitellidae
            Order Phyllodocida
                Family Glyceridae
                    Glycera sp.
                Family Nereidae
                    Neanthes limnicola
                Family Phyllodocidae
                    Eteone sp.
            Order Eunicida
                Family Arabellidae
            Order Terebellida
                Family Ampharetidae
                    Hobsonia florida
                Family Terebellidae
                    Amaeana sp.
            Order Sabellida
                Family Spirorbidae
        Class Oligochaeta
Phylum Mollusca
        Class Gastropoda

Subclass Opisthobranchia
Order Sacoglossa
Alderia (?) sp.
Class Bivalvia
Order Myoida
Family Myidae
Cryptomya californica
Order Veneroida
Family Tellenidae
Macoma balthica
Phylum Arthropoda
Subphylum Chelicerata
Class Arachnida
Order Pseudoscorpiones
Order Aranae
Order Acarina
Subphylum Mandibulata
Class Crustacea
Subclass Branchiopoda
Order Diplostraca
Suborder Cladocera
Family Polyphemidae
Podon sp.
Evadne sp.
Subclass Ostracoda
Subclass Copepoda
Order Calanoida
Order Cyclopoida
Order Harpacticoida
Subclass Cirripedia
Order Thoracica
Suborder Balanomorpha
Family Balanidae
Subclass Malacostraca
Superorder Peracarida
Order Mysidacea
Family Mysidae
Neomysis mercedis
Order Cumacea
Family Nannastacidae
Cumella sp.
Family Hemileuconidae
Hemileucon sp.
Order Tanaidacea
Family Tanaidae
Pancolus sp.

- Family Paratanaidae
  - *Leptochelia* sp.
- Order Isopoda
  - Suborder Flabellifera
    - Family Sphaeromatidae
      - *Gnorimosphaeroma lutea*
  - Suborder Valvifera
    - Family Idoteidae
      - *Idotea fewkesi*
      - *Idotea resecata*
  - Suborder Oniscoidea
    - Family Ligiidae
      - *Ligidium gracilis*
    - Family Oniscidae
      - *Porcellio scaber*
- Order Amphipoda
  - Suborder Gammaridea
    - Family Ampithoidae
      - *Ampithoe* sp.
    - Family Corophiidae
      - *Corophium* sp.
    - Family Gammaridae
      - *Anisogammarus confervicolus*
    - Family Haustoriidae
      - *Eohaustorius* sp.
    - Family Phoxocephalidae
      - *Paraphoxus* sp.
    - Family Talitridae
      - *Orchestia traskiana*
  - Suborder Caprellidea
    - Family Caprellidae
- Superorder Eucarida
  - Order Decapoda
    - Suborder Natantia
      - Family Crangonidae
        - *Crangon franciscorum*
        - *Crangon nigricauda*
      - Family Pandalidae
        - *Pandalus danae*
    - Suborder Reptantia
      - Family Callianassidae
      - Family Paguridae
      - Family Cancridae
        - *Cancer magister*
        - *Cancer productus*

Family Grapsidae
Hemigrapsus oregonensis
Family Majidae
Pugettia producta
Class Insecta
Subclass Apterygota
Order Collembola
Family Entomobryidae
Family Isotomidae
Family Onychiuridae
Family Poduridae
Family Sminthuridae
Order Diplura
Order Odonata
Suborder Anisoptera
Order Orthoptera
Order Thysanoptera
Order Hemiptera
Suborder Amphibicorizae
Family Saldidae
Suborder Geocorizae
Family Lygaeidae
Family Miridae
Family Pentatomidae
Suborder Hydrocorizae
Family Corixidae
Order Homoptera
Suborder Auchenorrhyncha
Family Cercopidae
Family Cicadellidae
Family Delphacidae
Suborder Sternorrhyncha
Family Aphididae
Order Coleoptera
Suborder Adephaga
Family Carabidae
Suborder Polyphaga
Family Hydrophilidae
Family Limnebiidae
Family Staphylinidae
Family Silphidae
Family Pselaphidae
Family Ptiliidae
Family Heteroceridae
Family Coccinellidae
Family Corylophidae
Family Chrysomelidae

Order Trichoptera
Family Limnephilidae
Order Lepidoptera
Suborder Frenatae
Family Pyralidae
Order Diptera
Suborder Nematocera
Family Tipulidae
Family Psychodidae
Family Ceratopongidae
Family Chironomidae
Family Culicidae
Family Mycetophilidae
Family Scatopsidae
Family Sciaridae
Family Cecidomyiidae
Family Stratiomyidae
Family Tabanidae
Family Dolichopodidae
Suborder Cyclorrhapha
Family Longchopteridae
Family Phoridae
Family Syrphidae
Family Sepsidae
Family Sciomyzidae
Family Sphaeroceridae
Family Ephydridae
Family Chloropidae
Family Muscidae
Order Hymenoptera
Suborder Apocrita
Family Formicidae
Class Chilopoda
Class Diplopoda
Phylum Echinodermata
Class Stelleroidea
Subclass Asteroidea
Order Forcipulatida
Leptasterias hexactis

APPENDIX C TAXONOMIC LIST OF FISH

Family	Scientific Name	Common Name
Ammodytidae	*Ammodytes hexapterus*	Pacific Sandlance
Atherinidae	*Atherinops affinis*	Topsmelt
Bothidae	*Citharichthys stigmaeus*	Speckled Sanddab
Cottidae	*Leptocottus armatus*	Staghorn Sculpin
Cottidae	*Enophrys bison*	Buffalo Sculpin
Cottidae	*Scorpaenichthys marmoratus*	Cabezon
Cottidae	*Cottus asper*	Prickly Sculpin
Cottidae	*Cottus aleuticus*	Coastal Sculpin
Embiotocidae	*Cymatogaster aggregata*	Shiner Surfperch
Embiotocidae	*Phanerodon furcatus*	White Surfperch
Engraulidadae	*Engraulis mordax*	Northern Anchovy
Gadidae	*Microgadus proximus*	Pacific Tomcod
Gasterosteidae	*Aulorhynchus flavidus*	Tubesnout
Gasterosteidae	*Gasterosteus aculeatus*	Threespine Stickleback
Hexagrammidae	*Ophiodon elongatus*	Lingcod
Hexagrammidae	*Hexagrammos decagrammus*	Kelp Greenling
Osmeridae	*Hypomesus pretiosus*	Surf Smelt
Pholidae	*Pholis ornata*	Saddleback Gunnel
Pleuronectidae	*Platichthys stellatus*	Starry Flounder
Pleuronectidae	*Parophrys vetulus*	English Sole
Pleuronectidae	*Psettichthys melanostictus*	Sand Sole
Salmonidae	*Oncorhynchus keta*	Chum Salmon
Salmonidae	*Oncorhynchus tshawytscha*	Chinook Salmon
Salmonidae	*Salmo gairdnerii*	Steelhead Trout
Scorpaenidae	*Sebastes spp*	Rockfish spp
Stichaetidae	*Lumpenus sagitta*	Snake Prickleback
Syngnathidae	*Syngnathus leptorhynchus*	Bay Pipefish

APPENDIX D

INVERTEBRATE SAMPLE DATA

Abbreviations used for gear in this appendix are:

AN = aquatic sweep net
CQ = clip-quadrat
LC = large corer
LD = large drift net
LE = large enclosure
MC = medium corer
SC = small corer
SD = small drift net
SE = small enclosure
TN = terrestiral sweep net

Table D-1. Density (number per m^2) of infauna, captured by MC in the exposed level marsh of the Low Sand area, 7 February 1978. The samples were 20 cm deep.

AREA SAMPLER SITE SAMPLE		L SAND MC 01 0015	L SAND MC 01 0023	L SAND MC 01 0048	L SAND MC 01 0075	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
POLYCHAETA						
AMPHARETIDAE SPP	ADULTS	123				30.8(53.4)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	370	2960	2220	2467	2004.4(980.5)
GASTROPODA						
GASTROPODA SPP	ADULTS		247	370		154.2(160.2)
ARANEAE						
ARANEAE SPP	ADULTS		247	123		92.5(102.3)
ACARINA						
ACARINA SPP	ADULTS	4317	2837	6908	247	3577.2(2412.4)
CUMACEA						
CUMELLA SPP	ADULTS		123		740	215.9(306.8)
AMPHIPODA						
COROPHIUM SPP	ADULTS				2097	524.2(908.0)
GAMMARIDEA SPP	ADULTS		123			30.8(53.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS				987	246.7(427.3)
TALITRIDAE SPP	ADULTS			247		61.7(106.8)
AMPITHOE SPP	ADULTS				123	30.8(53.4)
ORCHESTIA TRASKIANA	ADULTS				1604	400.9(694.4)
COLEOPTERA						
LIMNEBIIDAE SPP	ADULTS	123	123	1110		339.2(447.9)
DIPTERA						
DOLICHOPODIDAE SPP	LARVAE			493		123.3(213.6)
CERATOPOGONIDAE SPP	LARVAE	123	2344	20353		5704.9(8508.2)
CHIRONOMIDAE SPP	LARVAE	4687	8511	1234	54521	17238.2(21679.5)
TIPULIDAE SPP	LARVAE		1604	987		647.6(683.3)
	TOTAL	9743	19119	34045	62786	

Table D-2. Density (number per m^2) of infauna captured by MC in the exposed level marsh of the Low Silt area, 6 February 1978. The samples were 20 cm deep.

AREA		L SILT	L SILT	L SILT	L SILT	
SAMPLER		MC	MC	MC	MC	
SITE		01	01	01	01	
SAMPLE		0000	0023	0090	0093	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	247	247			123.3(123.3)
NEMATODA						
NEMATODA SPP	ADULTS			247	123	92.5(102.3)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	123				30.8(53.4)
HOBSONIA FLORIDA	ADULTS		740			185.0(320.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	4317	987	14185	2467	5489.1(5157.5)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			123	2960	770.9(1265.1)
AMPHIPODA						
AMPHIPODA SPP	ADULTS			123		30.8(53.4)
COROPHIUM SPP	ADULTS	4194	34661	1480	740	10268.9(14141.6)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	2344	2344	123		1202.7(1141.8)
INSECTA						
INSECTA SPP	NYMPHS	247				61.7(106.8)
DIPTERA						
MUSCIDAE SPP	LARVAE				123	30.8(53.4)
DOLICHOPODIDAE SPP	LARVAE	123		123	123	92.5(53.4)
CERATOPOGONIDAE SPP	LARVAE	21833	3207	2837	123	7000.1(8646.1)
CHIRONOMIDAE SPP	LARVAE				123	30.8(53.4)
PSYCHODIDAE SPP	LARVAE			247		61.7(106.8)
TIPULIDAE SPP	LARVAE				1357	339.2(587.5)
	TOTAL	33428	42186	19468	8139	

Table D-3. Density (number per m^2) of infauna captured by MC in the exposed level marsh of the Sedge area, 6 February 1978. The samples were 20 cm deep.

AREA SAMPLER SITE SAMPLE		SEDGE MC 01 0048	SEDGE MC 01 0051	SEDGE MC 01 0061	SEDGE MC 01 0089	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
NEMATODA						
NEMATODA SPP	ADULTS	863		493		339.2(363.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	2344	3577	2837	3084	2960.4(444.7)
ACARINA						
ACARINA SPP	ADULTS	493			370	215.9(220.2)
CIRRIPEDIA						
BALANADAE SPP	ADULTS				123	30.8(53.4)
CUMACEA						
HEMILEUCON SPP	ADULTS	1604	370			493.4(658.5)
CUMELLA SPP	ADULTS				123	30.8(53.4)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	987	123	370	863	585.9(353.0)
AMPHIPODA						
COROPHIUM SPP	ADULTS	1604			247	462.6(666.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	370	740		123	308.4(282.6)
TRICHOPTERA						
LIMNEPHILIDAE SPP	LARVAE				123	30.8(53.4)
DIPTERA						
EPHYDRIDAE SPP	LARVAE				123	30.8(53.4)
MUSCIDAE SPP	LARVAE			247		61.7(106.8)
DOLICHOPODIDAE SPP	LARVAE		247		123	92.5(102.3)
CERATOPOGONIDAE SPP	LARVAE	8264	4811	2220	1110	4101.4(2753.2)
CHIRONOMIDAE SPP	LARVAE	123				30.8(53.4)
TIPULIDAE SPP	LARVAE			740		185.0(320.5)
	TOTAL	16652	9868	6907	6412	

Table D-4. Density (number per m^2) of infauna captured by MC in the exposed level marsh of the Immature High area, 7 February 1978. The samples were 20 cm deep.

AREA / SAMPLER / SITE / SAMPLE		IM HI / MC / 01 / 0058	IM HI / MC / 01 / 0063	IM HI / MC / 01 / 0095	IM HI / MC / 01 / 0097	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
TURBELLARIA						
TURBELLARIA SPP	ADULTS	1357				339.2(587.5)
NEMATODA						
NEMATODA SPP	ADULTS				123	30.8(53.4)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	3207	4194	2960	7771	4533.1(1925.6)
ARTHROPODA						
ARTHROPODA SPP	UNSPECIFIED		123		123	61.7(61.7)
ARANEAE						
ARANEAE SPP	ADULTS	123	123		123	92.5(53.4)
ACARINA						
ACARINA SPP	ADULTS		370			92.5(160.2)
ISOPODA						
PORCELLIO SCABER	ADULTS		123			30.8(53.4)
LIGIDIUM GRACILIS	ADULTS				123	30.8(53.4)
AMPHIPODA						
ORCHESTIA TRASKIANA	ADULTS				123	30.8(53.4)
INSECTA						
INSECTA SPP	LARVAE				247	61.7(106.8)
HOMOPTERA						
HOMOPTERA SPP	ADULTS		123			30.8(53.4)
COLEOPTERA						
COLEOPTERA SPP	LARVAE		493		493	246.7(246.7)
DIPTERA						
DIPTERA SPP	PUPAE		123		123	61.7(61.7)
DIPTERA SPP	LARVAE		493		247	185.0(204.6)
DOLICHOPODIDAE SPP	LARVAE	247	740	123	617	431.7(254.3)
CERATOPOGONIDAE SPP	LARVAE		247		247	123.3(123.3)
CHIRONOMIDAE SPP	LARVAE	123	1110	370	1727	832.6(631.2)
MYCETOPHILIDAE SPP	LARVAE		247	493		185.0(204.6)
HYMENOPTERA						
HYMENOPTERA SPP	LARVAE		123			30.8(53.4)
CHILOPODA						
CHILOPODA SPP	ADULTS		247			61.7(106.8)
	TOTAL	5057	8475	3946	12087	

Table D-5. Density (number per m^2) of infauna captured by MC in the exposed level marsh of the Mature High area, 7 April 1978. The samples were 5 - 8 cm deep.

AREA SAMPLER SITE SAMPLE		MAT HI MC 01 0009	MAT HI MC 01 0023	MAT HI MC 01 0071	MAT HI MC 01 0092	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	2960	617		247	956.0(1177.9)
ARANEAE						
ARANEAE SPP	ADULTS	493	493	123	987	524.2(306.8)
ACARINA						
ACARINA SPP	ADULTS		493	863	493	462.6(306.8)
ISOPODA						
LIGIDIUM GRACILIS	ADULTS	247		247	740	308.4(268.8)
COLEOPTERA						
STAPHYLINIDAE SPP	ADULTS			247		61.7(106.8)
DIPTERA						
DIPTERA SPP	PUPAE	247	493	617	123	370.0(195.0)
DIPTERA SPP	LARVAE				123	30.8(53.4)
DOLICHOPODIDAE SPP	LARVAE	370	493	987	1357	801.8(394.9)
CERATOPOGONIDAE SPP	LARVAE		740	247	863	462.6(353.0)
CHIRONOMIDAE SPP	LARVAE		493	123	617	308.4(254.3)
TIPULIDAE SPP	LARVAE		247			61.7(106.8)
MYCETOPHILIDAE SPP	LARVAE	493	987	247	370	524.2(280.9)
HYMENOPTERA						
FORMICIDAE SPP	ADULTS			123		30.8(53.4)
DIPLOPODA						
DIPLOPODA SPP	ADULTS				123	30.8(53.4)
	TOTAL	4810	5056	3824	6043	

Table D-6. Density (number per m^2) of animals captured by CQ in the exposed level marsh of the Low Sand area, 29 August 1978.

AREA		L SAND	L SAND	L SAND	L SAND	
SAMPLER		CQ	CQ	CQ	CQ	
SITE		10	10	10	10	
SAMPLE		0001	0002	0003	0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS		16	16		8.0(8.0)
ACARINA						
ACARINA SPP	ADULTS	144	656	496	528	456.0(189.8)
AMPHIPODA						
AMPHIPODA SPP	ADULTS				16	4.0(6.9)
DIPLURA						
DIPLURA SPP	ADULTS		16	48		16.0(19.6)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS			16		4.0(6.9)
COLEOPTERA						
COLEOPTERA SPP	ADULTS		48			12.0(20.8)
CARABIDAE SPP	ADULTS	16				4.0(6.9)
LIMNEBIIDAE SPP	ADULTS	32			80	28.0(32.7)
DIPTERA						
CERATOPOGONIDAE SPP	ADULTS		16			4.0(6.9)
CHIRONOMIDAE SPP	ADULTS			16		4.0(6.9)
	TOTAL	192	752	592	624	

Table D-7. Density (number per m^2) of animals captured by CQ in the exposed level marsh of the Low Silt area, 7 September 1978.

AREA SAMPLER SITE SAMPLE		L SILT CQ 13 0001	L SILT CQ 13 0002	L SILT CQ 13 0003	L SILT CQ 13 0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	32			16	12.0(13.3)
ACARINA						
ACARINA SPP	ADULTS	496	848	1744	1264	1088.0(466.2)
ISOPODA						
ISOPODA SPP	ADULTS	48	128	416	288	220.0(142.4)
HEMIPTERA						
SALDIDAE SPP	NYMPHS		16			4.0(6.9)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS			16	16	8.0(8.0)
APHIDIDAE SPP	ADULTS	48	224	480	64	204.0(173.6)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS		48	16	64	32.0(25.3)
	TOTAL	624	1264	2672	1712	

Table D-8. Density (number per m^2) of animals captured by CQ in the exposed level marsh of the Sedge area, 7 September 1978.

AREA SAMPLER SITE SAMPLE		SEDGE CQ 13 0001	SEDGE CQ 13 0002	SEDGE CQ 13 0003	SEDGE CQ 13 0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	48	32			20.0(20.8)
ACARINA						
ACARINA SPP	ADULTS	5184	3024	2240	4672	3780.0(1194.8)
CIRRIPEDIA						
CIRRIPEDIA SPP	ADULTS				320	80.0(138.6)
AMPHIPODA						
AMPHIPODA SPP	ADULTS	32	112	16		40.0(43.1)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS				64	16.0(27.7)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS	16				4.0(6.9)
APHIDIDAE SPP	ADULTS	16	16		16	12.0(6.9)
DIPTERA						
SCIARIDAE SPP	ADULTS		32		16	12.0(13.3)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS			32		8.0(13.9)
	TOTAL	5296	3216	2288	5088	

Table D-9. Density (number per m^2) of animals captured by CQ in the exposed level marsh of the Immature High area, 29 August 1978.

AREA SAMPLER SITE SAMPLE		IM HI CQ 10 0001	IM HI CQ 10 0002	IM HI CQ 10 0003	IM HI CQ 10 0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	32	96		64	48.0(35.8)
ACARINA						
ACARINA SPP	ADULTS	912	2848	880	2160	1700.0(840.1)
ISOPODA						
ISOPODA SPP	ADULTS	16	64		32	28.0(23.7)
COLLEMBOLA						
SMINTHURIDAE SPP	ADULTS	80	160	16	128	96.0(54.3)
ISOTOMIDAE SPP	ADULTS	560	656	80	1248	636.0(415.3)
ENTOMOBRYIDAE SPP	ADULTS		320		48	92.0(133.1)
PODURIDAE SPP	ADULTS	32				8.0(13.9)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS	48	16			16.0(19.6)
HEMIPTERA						
HEMIPTERA SPP	ADULTS			16		4.0(6.9)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS		48	48		24.0(24.0)
APHIDIDAE SPP	ADULTS	16	32		16	16.0(11.3)
COLEOPTERA						
COLEOPTERA SPP	ADULTS	16			48	16.0(19.6)
STAPHYLINIDAE SPP	ADULTS				16	4.0(6.9)
PSELAPHIDAE SPP	ADULTS			16		4.0(6.9)
LIMNEBIIDAE SPP	ADULTS			16	64	20.0(26.2)
PTILIIDAE SPP	ADULTS		16	32	32	20.0(13.3)
CORYLOPHIDAE SPP	ADULTS				16	4.0(6.9)
HETEROCERIDAE SPP	ADULTS				48	12.0(20.8)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS		16			4.0(6.9)
	TOTAL	1712	4272	1104	3920	

Table D-10. Density (number per m^2) of animals captured by CQ in the exposed level marsh of the Mature High area, 25 September 1978.

AREA SAMPLER SITE SAMPLE		MAT HI CQ 10 0001	MAT HI CQ 10 0002	MAT HI CQ 10 0003	MAT HI CQ 10 0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	144	144	128	80	124.0(26.2)
ACARINA						
ACARINA SPP	ADULTS	592	3696	2496	3808	2648.0(1293.7)
ISOPODA						
ISOPODA SPP	ADULTS		16			4.0(6.9)
AMPHIPODA						
AMPHIPODA SPP	ADULTS				16	4.0(6.9)
COLLEMBOLA						
SMINTHURIDAE SPP	ADULTS		80	112	112	76.0(45.8)
ISOTOMIDAE SPP	ADULTS	816	848	1840	2352	1464.0(657.5)
PODURIDAE SPP	ADULTS		112	32	608	188.0(245.9)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS		64	112	96	68.0(42.9)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS		16	32		12.0(13.3)
APHIDIDAE SPP	ADULTS	16	48	112	560	184.0(219.8)
COLEOPTERA						
STAPHYLINIDAE SPP	ADULTS			16		4.0(6.9)
PSELAPHIDAE SPP	ADULTS	16	16			8.0(8.0)
CARABIDAE SPP	ADULTS				16	4.0(6.9)
LIMNEBIIDAE SPP	ADULTS	32	16	16		16.0(11.3)
PTILIIDAE SPP	ADULTS	32	48	16	16	28.0(13.3)
CORYLOPHIDAE SPP	ADULTS		128	48	16	48.0(49.3)
LEPIDOPTERA						
LEPIDOPTERA SPP	ADULTS				32	8.0(13.9)
DIPTERA						
CHIRONOMIDAE SPP	ADULTS		16	128	16	40.0(51.2)
PSYCHODIDAE SPP	ADULTS	16				4.0(6.9)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS		16		16	8.0(8.0)
	TOTAL	1664	5264	5088	7744	

Number of animals captured in standardized TN collections (non-quantitative) in the ... level marsh vegetation of the Low Sand area, 29 August 1978.

AREA SAMPLER SITE SAMPLE		L SAND TN 10 0001	L SAND TN 10 0002	L SAND TN 10 0003	L SAND TN 10 0004		
TAXON	LIFE STAGE					MEAN(SD)	
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	1	1		1	.8(	.4)
ACARINA							
ACARINA SPP	ADULTS	29	43	40	10	30.5(	12.9)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS		1	1		.5(	.5)
HEMIPTERA							
SALDIDAE SPP	NYMPHS	2		2		1.0(	1.0)
SALDIDAE SPP	ADULTS	1	1	1		.8(	.4)
HOMOPTERA							
CERCOPIDAE SPP	ADULTS				1	.3(	.4)
CICADELLIDAE SPP	ADULTS	18		9	11	9.5(	6.4)
COLEOPTERA							
COLEOPTERA SPP	ADULTS		1		1	.5(	.5)
COCCINELLIDAE SPP	ADULTS		1			.3(	.4)
LIMNEBIIDAE SPP	ADULTS	1		1	2	1.0(	.7)
DIPTERA							
DIPTERA SPP	ADULTS			1		.3(	.4)
EPHYDRIDAE SPP	ADULTS	8	16	11	2	9.3(	5.1)
MUSCIDAE SPP	ADULTS	59	31	18	13	30.3(	17.9)
DOLICHOPODIDAE SPP	ADULTS	1		1		.5(	.5)
SPHAEROCERIDAE SPP	ADULTS		2	4		1.5(	1.7)
SYRPHIDAE SPP	ADULTS			1		.3(	.4)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	9	3	5	3	5.0(	2.4)
	TOTAL	129	100	95	44		

Table D-12. Number of animals captured in standardized TN collections (non-quantitative) in the exposed level marsh vegetation of the Low Silt area, 7 September 1978.

AREA SAMPLER SITE SAMPLE		L SILT TN 13 0001	L SILT TN 13 0002	L SILT TN 13 0003	L SILT TN 13 0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	118	32	31	71	63.0(35.6)
ACARINA						
ACARINA SPP	ADULTS	1016	392	538	726	668.0(233.2)
ISOPODA						
ISOPODA SPP	ADULTS			2		.5(.9)
AMPHIPODA						
AMPHIPODA SPP	ADULTS			6		1.5(2.6)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS	5		2		1.8(2.0)
HEMIPTERA						
HEMIPTERA SPP	UNSPECIFIED	3			1	1.0(1.2)
HEMIPTERA SPP	ADULTS	7	4	1	5	4.3(2.2)
PENTATOMIDAE SPP	UNSPECIFIED	3			2	1.3(1.3)
PENTATOMIDAE SPP	ADULTS	3				.8(1.3)
SALDIDAE SPP	NYMPHS	18		2	15	8.8(7.9)
SALDIDAE SPP	ADULTS	17	6		11	8.5(6.3)
LYGAEIDAE SPP	ADULTS		2	1	9	3.0(3.5)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS	317	152	186	214	217.3(61.6)
APHIDIDAE SPP	ADULTS	338	225	452	477	373.0(100.2)
COLEOPTERA						
COCCINELLIDAE SPP	ADULTS	2	1	1	4	2.0(1.2)
DIPTERA						
DIPTERA SPP	ADULTS	3	2	8	4	4.3(2.3)
EPHYDRIDAE SPP	ADULTS	2			4	1.5(1.7)
MUSCIDAE SPP	ADULTS	16			13	7.3(7.3)
DOLICHOPODIDAE SPP	ADULTS	3			5	2.0(2.1)
CERATOPOGONIDAE SPP	ADULTS	22	8	17	18	16.3(5.1)
CHIRONOMIDAE SPP	ADULTS	5		6	7	4.5(2.7)
PSYCHODIDAE SPP	ADULTS	5	3	5	12	6.3(3.4)
CULICIDAE SPP	ADULTS	1		2	1	1.0(.7)
CHLOROPIDAE SPP	ADULTS	4	2		5	2.8(1.9)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS	53	39	28	26	36.5(10.7)
	TOTAL	1961	868	1288	1630	

Table D-13. Number of animals captured in standardized TN collections (non-quantitative) in the exposed level marsh vegetation of the Sedge area, 7 September 1978.

AREA		SEDGE	SEDGE	SEDGE	SEDGE		
SAMPLER		TN	TN	TN	TN		
SITE		13	13	13	13		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN(SD)	
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	120	72	46	94	83.0(	27.3)
ACARINA							
ACARINA SPP	ADULTS	220	570	456	795	510.3(	207.3)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS		2	6	1	2.3(	2.3)
HEMIPTERA							
SALDIDAE SPP	NYMPHS	2		1		.8(	.8)
MIRIDAE SPP	UNSPECIFIED			1	1	.5(	.5)
MIRIDAE SPP	ADULTS			1		.3(	.4)
HOMOPTERA							
DELPHACIDAE SPP	ADULTS	424	299	215	350	322.0(	76.1)
CICADELLIDAE SPP	ADULTS	2	3	8	4	4.3(	2.3)
APHIDIDAE SPP	ADULTS	1	2	1	1	1.3(	.4)
COLEOPTERA							
COCCINELLIDAE SPP	ADULTS	1			1	.5(	.5)
CARABIDAE SPP	ADULTS	1				.3(	.4)
DIPTERA							
DIPTERA SPP	ADULTS	5	9		1	3.8(	3.6)
EPHYDRIDAE SPP	ADULTS	11	5	1	10	6.8(	4.0)
MUSCIDAE SPP	ADULTS	34	9	2	15	15.0(	11.9)
DOLICHOPODIDAE SPP	ADULTS	3				.8(	1.3)
CERATOPOGONIDAE SPP	ADULTS	3	2	6	2	3.3(	1.6)
PSYCHODIDAE SPP	ADULTS	4	2	2	6	3.5(	1.7)
CULICIDAE SPP	ADULTS	2			1	.8(	.8)
SPHAEROCERIDAE SPP	ADULTS	5			1	1.5(	2.1)
TIPULIDAE SPP	ADULTS	3				.8(	1.3)
CHLOROPIDAE SPP	ADULTS	3			7	2.5(	2.9)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	25	5	6	11	11.8(	8.0)
	TOTAL	869	980	752	1301		

Table D-14. Number of animals captured in standardized TN collections (non-quantitative) in the exposed level marsh vegetation of the Immature High area, 29 August 1978.

AREA SAMPLER SITE SAMPLE		IM HI TN 10 0001	IM HI TN 10 0002	IM HI TN 10 0003	IM HI TN 10 0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	18	21	13	13	16.3(3.4)
ACARINA						
ACARINA SPP	ADULTS	10		34	7	12.8(12.8)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS	1	7		2	2.5(2.7)
HEMIPTERA						
HEMIPTERA SPP	UNSPECIFIED	1				.3(.4)
HEMIPTERA SPP	ADULTS		1			.3(.4)
MIRIDAE SPP	UNSPECIFIED	1				.3(.4)
MIRIDAE SPP	ADULTS		1	1	1	.8(.4)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS	28	8	1	10	11.8(10.0)
CERCOPIDAE SPP	ADULTS	1	6	3	1	2.8(2.0)
CICADELLIDAE SPP	ADULTS	9	7	7	2	6.3(2.6)
APHIDIDAE SPP	ADULTS	1		3	1	1.3(1.1)
COLEOPTERA						
COLEOPTERA SPP	ADULTS		3	5		2.0(2.1)
COCCINELLIDAE SPP	ADULTS		1	3		1.0(1.2)
STAPHYLINIDAE SPP	ADULTS	1				.3(.4)
PSELAPHIDAE SPP	ADULTS	4	1		1	1.5(1.5)
CHRYSOMELIDAE SPP	ADULTS	3	2		1	1.5(1.1)
LEPIDOPTERA						
LEPIDOPTERA SPP	ADULTS		1	1		.5(.5)
DIPTERA						
DIPTERA SPP	ADULTS	6			1	1.8(2.5)
EPHYDRIDAE SPP	ADULTS	1				.3(.4)
MUSCIDAE SPP	ADULTS	2		1	1	1.0(.7)
DOLICHOPODIDAE SPP	ADULTS	31	12	15	11	17.3(8.1)
CERATOPOGONIDAE SPP	ADULTS			2		.5(.9)
CULICIDAE SPP	ADULTS	1	2			.8(.8)
SPHAEROCERIDAE SPP	ADULTS		5	2	4	2.8(1.9)
LONCHOPTERIDAE SPP	ADULTS	4	2			1.5(1.7)
SCIARIDAE SPP	ADULTS	8	8	12	2	7.5(3.6)
SCATOPSIDAE SPP	ADULTS	2	2	1		1.3(.8)
SEPSIDAE SPP	ADULTS			3		.8(1.3)
PHORIDAE SPP	ADULTS			2		.5(.9)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS	29	6	22	12	17.3(8.9)
	TOTAL	162	96	131	70	

Table D-15. Number of animals captured in standardized TN collections (non-quantitative) in the exposed level marsh vegetation of the Mature High area, 25 September 1978.

AREA SAMPLER SITE SAMPLE		MAT HI TN 10 0001	MAT HI TN 10 0002	MAT HI TN 10 0003	MAT HI TN 10 0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	12	15	10	13	12.5(1.8)
ACARINA						
ACARINA SPP	ADULTS	21	32	7	2	15.5(11.8)
COLLEMBOLA						
SMINTHURIDAE SPP	ADULTS		1			.3(.4)
ORTHOPTERA						
ORTHOPTERA SPP	ADULTS	1	1			.5(.5)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS	31	11	4	2	12.0(11.5)
HEMIPTERA						
PENTATOMIDAE SPP	UNSPECIFIED		1			.3(.4)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS	123	106	48	69	86.5(29.6)
CICADELLIDAE SPP	ADULTS	30	23	6	12	17.8(9.3)
APHIDIDAE SPP	ADULTS	5		1	1	1.8(1.9)
COLEOPTERA						
COLEOPTERA SPP	ADULTS		1	1		.5(.5)
PSELAPHIDAE SPP	ADULTS			2		.5(.9)
LIMNEBIIDAE SPP	ADULTS			1		.3(.4)
CHRYSOMELIDAE SPP	ADULTS	4				1.0(1.7)
DIPTERA						
DIPTERA SPP	ADULTS	3	3	4	8	4.5(2.1)
EPHYDRIDAE SPP	ADULTS	1				.3(.4)
MUSCIDAE SPP	ADULTS		1	2		.8(.8)
CERATOPOGONIDAE SPP	ADULTS	4	1	3		2.0(1.6)
CHIRONOMIDAE SPP	ADULTS	2	1			.8(.8)
PSYCHODIDAE SPP	ADULTS	4	3	5		3.0(1.9)
CULICIDAE SPP	ADULTS			1		.3(.4)
SPHAEROCERIDAE SPP	ADULTS	1		1	2	1.0(.7)
SCIARIDAE SPP	ADULTS	2				.5(.9)
SCATOPSIDAE SPP	ADULTS	1				.3(.4)
SCIOMYZIDAE SPP	ADULTS				1	.3(.4)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS	64	58	24	8	38.5(23.3)
	TOTAL	309	258	120	118	

Table D-16. Density (number per m^2) of animals captured by SE along a strand line in the exposed level marsh of the Low Sand area, 29 August 1978.

AREA SAMPLER SITE SAMPLE		L SAND SE 12 0001	L SAND SE 12 0002	L SAND SE 12 0003	L SAND SE 12 0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	699	577	489	454	554.7(94.4)
ACARINA						
ACARINA SPP	ADULTS	9993	5590	13033	12019	10158.8(2855.6)
AMPHIPODA						
AMPHIPODA SPP	ADULTS	804	751	804	1537	974.0(326.0)
COLLEMBOLA						
SMINTHURIDAE SPP	ADULTS				17	4.4(7.6)
ISOTOMIDAE SPP	ADULTS	2009	1467	2306	6586	3092.2(2039.5)
ONYCHIURIDAE SPP	ADULTS	157	35	17	751	240.2(299.9)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS	17	35			13.1(14.5)
HEMIPTERA						
SALDIDAE SPP	NYMPHS		402			100.5(174.0)
SALDIDAE SPP	ADULTS	559		245	105	227.1(210.4)
COLEOPTERA						
STAPHYLINIDAE SPP	ADULTS	157				39.3(68.1)
CARABIDAE SPP	ADULTS	105	52	35	52	61.1(26.2)
LIMNEBIIDAE SPP	ADULTS	681	384	52	507	406.2(229.9)
LEPIDOPTERA						
LEPIDOPTERA SPP	ADULTS	17		17		8.7(8.7)
DIPTERA						
DIPTERA SPP	ADULTS				17	4.4(7.6)
CHIRONOMIDAE SPP	ADULTS	17				4.4(7.6)
SPHAEROCERIDAE SPP	ADULTS	105	210	70		96.1(75.6)
SCIARIDAE SPP	ADULTS	17				4.4(7.6)
CECIDOMYIIDAE SPP	ADULTS	35				8.7(15.1)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS		52	52		26.2(26.2)
	TOTAL	15372	9555	17120	22045	

Table D-17. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Low Sand area, 7 February 1978.

AREA		L SAND	L SAND	L SAND	L SAND		
SAMPLER		LE	LE	LE	LE		
SITE		01	01	01	01		
SAMPLE		0053	0059	0078	0080		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
CNIDARIA							
CNIDARIA SPP	ADULTS		27		6	8.3(	10.9)
NEMERTEA							
NEMERTEA SPP	ADULTS	3				.6(	1.1)
NEMATODA							
NEMATODA SPP	ADULTS		4			1.0(	1.6)
POLYCHAETA							
AMPHARETIDAE SPP	ADULTS		20			5.1(	8.8)
ETEONE SPP	ADULTS			1	1	.6(	.6)
HAPLOSCOLOPLOS SPP	ADULTS	1	3	5	5	3.5(	1.6)
AMAEANA SPP	ADULTS			3		.6(	1.1)
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	94	70	62	117	85.7(	21.4)
ARANEAE							
ARANEAE SPP	ADULTS	3	6	4	18	7.6(	6.0)
ACARINA							
ACARINA SPP	ADULTS	8	1998	490	974	867.4(	736.6)
COPEPODA							
CALANOIDA SPP	ADULTS		3	5	3	2.5(	1.9)
HARPACTICOIDA SPP	ADULTS	1				.3(	.5)
CUMACEA							
CUMELLA SPP	ADULTS	6	56	84	65	52.7(	28.6)
ISOPODA							
GNORIMOSPHAEROMA LUTEA	ADULTS				1	.3(	.5)
AMPHIPODA							
COROPHIUM SPP	ADULTS	1	5	1	3	2.5(	1.6)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	13	20	10	8	12.7(	4.8)
TALITRIDAE SPP	ADULTS	105	79	50		58.4(	39.1)
ORCHESTIA TRASKIANA	ADULTS	5	1	1	69	19.0(	28.6)
DECAPODA							
DECAPODA SPP	ZOEA	4	1	4		2.2(	1.6)
INSECTA							
INSECTA SPP	PUPAE			1		.3(	.5)
HEMIPTERA							
SALDIDAE SPP	ADULTS		1			.3(	.5)
COLEOPTERA							
COLEOPTERA SPP	LARVAE				1	.3(	.5)
LIMNEBIIDAE SPP	ADULTS		11	10	22	10.8(	7.6)
HETEROCERIDAE SPP	ADULTS		3			.6(	1.1)
DIPTERA							
DIPTERA SPP	LARVAE		1			.3(	.5)
DIPTERA SPP	ADULTS		1			.3(	.5)
EPHYDRIDAE SPP	ADULTS				1	.3(	.5)
MUSCIDAE SPP	LARVAE		1		1	.6(	.6)
DOLICHOPODIDAE SPP	LARVAE	1	14		15	7.6(	7.9)
DOLICHOPODIDAE SPP	ADULTS				4	1.3(	1.6)
CERATOPOGONIDAE SPP	LARVAE	566	309	71	419	341.3(	180.9)
CHIRONOMIDAE SPP	LARVAE		137		9	36.2(	55.4)
PSYCHODIDAE SPP	LARVAE				1	.3(	.5)
TIPULIDAE SPP	LARVAE	22	47	37	26	32.4(	10.2)
MYCETOPHILIDAE SPP	LARVAE				4	1.0(	1.6)
FISH							
COTTIDAE							
LEPTOCOTTUS ARMATUS	ADULTS			1		.3(	.5)
	TOTAL	833	2018	840	1770		

Table D-18. Density (number per m^2) of pelagic and epifaunal fauna captured by LE in the submerged level marsh of the Low Sand area, 21 July 1978.

AREA SAMPLER SITE SAMPLE		L SAND LE 01 0001	L SAND LE 01 0032	L SAND LE 01 0086	L SAND LE 01 0094		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
NEMATODA							
NEMATODA SPP	ADULTS	6				1.6(	2.7)
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	3		21	3	6.4(	8.2)
GASTROPODA							
ALDERIA SPP	ADULTS	11			3	3.5(	4.7)
ARANEAE							
ARANEAE SPP	ADULTS	42	30	151	85	77.1(	47.2)
ACARINA							
ACARINA SPP	ADULTS	4050	3049	28196	6387	10420.5(	10333.8)
COPEPODA							
HARPACTACOIDA SPP	ADULTS	276				68.9(	119.3)
MYSIDACEA							
MYSIDACEA SPP	LARVAE				1	.3(	.5)
CUMACEA							
HEMILEUCON SPP	ADULTS	1				.3(	.5)
CUMELLA SPP	ADULTS	1				.3(	.5)
TANAIDACEA							
TANAIDACEA SPP	ADULTS	1				.3(	.5)
AMPHIPODA							
COROPHIUM SPP	ADULTS			3		.6(	1.1)
TALITRIDAE SPP	ADULTS	1			15	4.1(	6.4)
AMPITHOE SPP	ADULTS	1		1	3	1.3(	.9)
ORCHESTIA TRASKIANA	ADULTS		17	29	102	36.9(	38.8)
INSECTA							
INSECTA SPP	LARVAE		1			.3(	.5)
HEMIPTERA							
PENTATOMIDAE SPP	ADULTS	1				.3(	.5)
SALDIDAE SPP	NYMPHS	33	17	51	61	42.0(	16.6)
SALDIDAE SPP	ADULTS	5	4	9	9	6.7(	2.3)
HOMOPTERA							
HOMOPTERA SPP	ADULTS				1	.3(	.5)
DELPHACIDAE SPP	ADULTS	4	1	12	17	8.3(	6.1)
APHIDIDAE SPP	ADULTS	4			3	1.6(	1.6)
COLEOPTERA							
COLEOPTERA SPP	LARVAE	3	1	4	10	4.4(	3.4)
STAPHYLINIDAE SPP	ADULTS		1	1		.6(	.6)
CARABIDAE SPP	ADULTS		4	1	4	2.2(	1.6)
LIMNEBIIDAE SPP	ADULTS	9	30	95	76	52.5(	34.4)
DIPTERA							
DIPTERA SPP	PUPAE	4				1.0(	1.6)
DIPTERA SPP	ADULTS	1			3	1.0(	1.1)
MUSCIDAE SPP	LARVAE			8		1.9(	3.3)
CERATOPOGONIDAE SPP	LARVAE	3		4		1.6(	1.7)
CERATOPOGONIDAE SPP	ADULTS	9		3		2.9(	3.6)
CHIRONOMIDAE SPP	LARVAE	55		1		14.0(	23.5)
PSYCHODIDAE SPP	LARVAE			4		1.0(	1.7)
SCIARIDAE SPP	ADULTS				1	.3(	.5)
SCATOPSIDAE SPP	ADULTS	1				.3(	.5)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	3	3	5	3	3.2(	1.1)
	TOTAL	4534	3158	28593	6787		

Table D-19. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Low Sand area, 17 October 1978.

AREA / SAMPLER / SITE / SAMPLE		L SAND / LE / 01 / 0016	L SAND / LE / 01 / 0031	L SAND / LE / 01 / 0087	L SAND / LE / 01 / 0095	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
POLYCHAETA						
SPIRORBIDAE SPP	ADULTS			262		65.4(113.3)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	13	5	20	8	11.4(5.8)
GASTROPODA						
ALDERIA SPP	ADULTS		3			.6(1.1)
ARANEAE						
ARANEAE SPP	ADULTS	75	22	25	81	50.8(27.4)
ACARINA						
ACARINA SPP	ADULTS	6711	3909	7531	2657	5702.0(2494.3)
CUMACEA						
CUMELLA SPP	ADULTS	3				.6(1.1)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			3		.6(1.1)
AMPHIPODA						
ORCHESTIA TRASKIANA	ADULTS	30	1	132	131	73.7(58.7)
HEMIPTERA						
SALDIDAE SPP	NYMPHS		1			.3(.5)
SALDIDAE SPP	ADULTS		3		3	1.3(1.3)
COLEOPTERA						
STAPHYLINIDAE SPP	ADULTS		3			.6(1.1)
LIMNEBIIDAE SPP	ADULTS	27	13	25	132	49.2(48.2)
DIPTERA						
DIPTERA SPP	PUPAE		3			.6(1.1)
DOLICHOPODIDAE SPP	ADULTS		1			.3(.5)
CERATOPOGONIDAE SPP	LARVAE		8			1.9(3.3)
CHIRONOMIDAE SPP	LARVAE				3	.6(1.1)
TABANIDAE SPP	LARVAE		1			.3(.5)
FISH						
GASTEROSTEIDAE						
GASTEROSTEUS ACULEATUS	ADULTS	1				.3(.5)
	TOTAL	6860	3973	7998	3015	

Table D-20. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Low Silt area, 6 April 1978.

AREA SAMPLER SITE SAMPLE		L SILT LE 01 0053	L SILT LE 01 0061	L SILT LE 01 0082	L SILT LE 01 0096	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	34	377	136	51	149.5(137.8)
NEMATODA						
NEMATODA SPP	ADULTS	3	83			21.3(35.6)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS		236	13		62.2(100.6)
NEANTHES LIMNICOLA	ADULTS		1		1	.6(.6)
MOOSONIA FLORIDA	ADULTS	1	215	5	75	74.0(86.3)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	194	1021	17	272	375.9(383.8)
ACARINA						
ACARINA SPP	ADULTS	11		1		3.2(4.8)
OSTRACODA						
OSTRACODA SPP	ADULTS	4		20	3	6.7(8.0)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	1				.3(.5)
CUMACEA						
HEMILEUCON SPP	ADULTS	36	1899	404	307	661.4(727.0)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	251	47	126	716	285.1(259.4)
AMPHIPODA						
COROPHIUM SPP	ADULTS	33	2246	74	862	803.6(897.2)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	168	38	217	1342	441.3(524.3)
COLLEMBOLA						
ISOTOMIDAE SPP	ADULTS			1		.3(.5)
ONYCHIURIDAE SPP	ADULTS		1			.3(.5)
DIPTERA						
DIPTERA SPP	PUPAE	108		24	5	34.3(43.5)
MUSCIDAE SPP	LARVAE			9		2.2(3.9)
DOLICHOPODIDAE SPP	LARVAE	5	1	5		2.9(2.3)
CERATOPOGONIDAE SPP	LARVAE	50	1063	353	24	374.0(418.8)
CHIRONOMIDAE SPP	LARVAE	1	1	8		2.5(3.9)
TIPULIDAE SPP	LARVAE	1	5			1.6(2.1)
STRATIOMYIDAE SPP	LARVAE			1		.3(.5)
TABANIDAE SPP	LARVAE				1	.3(.5)
FISH						
COTTIDAE						
LEPTOCOTTUS ARMATUS	ADULTS		1	3	1	1.3(.9)
	TOTAL	904	7237	1417	3660	

Table D-21. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Low Silt area, 21 July 1978.

AREA		L_SILT	L_SILT	L_SILT	L_SILT	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0027	0073	0077	0095	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		1			.3(.5)
POLYCHAETA						
HOBSONIA FLORIDA	ADULTS	5	1	119		31.4(50.8)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	72	8	107	193	94.9(66.9)
GASTROPODA						
ALDERIA SPP	ADULTS		6			1.6(2.7)
ARANEAE						
ARANEAE SPP	ADULTS	108	9	37	42	48.9(36.3)
ACARINA						
ACARINA SPP	ADULTS	10	3	1	19	8.3(7.1)
OSTRACODA						
OSTRACODA SPP	ADULTS		5			1.3(2.2)
CUMACEA						
HEMILEUCON SPP	ADULTS	18	6			6.0(7.3)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	13820	751	4403	7103	6519.2(4780.2)
AMPHIPODA						
COROPHIUM SPP	ADULTS	306	1	36		85.7(128.3)
INSECTA						
INSECTA SPP	ADULTS				1	.3(.5)
HEMIPTERA						
SALDIDAE SPP	NYMPHS	46	22	72	37	44.1(15.5)
SALDIDAE SPP	ADULTS	19	4	11	3	9.2(6.6)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS			10		2.5(4.4)
CICADELLIDAE SPP	ADULTS				1	.3(.5)
APHIDIDAE SPP	ADULTS	6	3		1	2.5(2.4)
COLEOPTERA						
COLEOPTERA SPP	ADULTS			1		.3(.5)
STAPHYLINIDAE SPP	ADULTS	15	1		3	4.8(6.1)
DIPTERA						
DIPTERA SPP	PUPAE	52	33	22	32	34.6(11.3)
DIPTERA SPP	LARVAE		1			.3(.5)
DIPTERA SPP	ADULTS		1	1	1	1.0(.5)
MUSCIDAE SPP	LARVAE				9	2.2(3.9)
DOLICHOPODIDAE SPP	LARVAE				1	.3(.5)
CERATOPOGONIDAE SPP	LARVAE	67	6	41	86	50.2(30.1)
CHIRONOMIDAE SPP	LARVAE	5				1.3(2.2)
PSYCHODIDAE SPP	LARVAE	44	1	8	479	133.0(200.3)
TIPULIDAE SPP	LARVAE				18	4.4(7.7)
STRATIOMYIDAE SPP	LARVAE		4	6		2.5(2.7)
TABANIDAE SPP	LARVAE			1		.3(.5)
HYMENOPTERA						
HYMENOPTERA SPP	LARVAE	5				1.3(2.2)
FISH						
GASTEROSTEIDAE						
GASTEROSTEUS ACULEATUS	ADULTS				3	.6(1.1)
	TOTAL	14598	867	4876	8032	

Table D-22. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Low Silt area, 16 October 1978.

AREA / SAMPLER / SITE / SAMPLE		L SILT LE 01 0026	L SILT LE 01 0065	L SILT LE 01 0076	L SILT LE 01 0087	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS				10	2.5(4.4)
NEMATODA						
NEMATODA SPP	ADULTS				2351	587.7(1017.9)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS				357	89.2(154.5)
HOBSONIA FLORIDA	ADULTS				239	59.7(103.4)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	52	226	415	5460	1538.4(2267.6)
GASTROPODA						
ALDERIA SPP	ADULTS				41	10.2(17.6)
ARANEAE						
ARANEAE SPP	ADULTS		77	6		21.0(32.7)
ACARINA						
ACARINA SPP	ADULTS		16	13	4	8.6(7.0)
OSTRACODA						
OSTRACODA SPP	ADULTS				1185	236.2(513.1)
COPEPODA						
HARPACTACOIDA SPP	ADULTS				20	5.1(8.8)
CUMACEA						
HEMILEUCON SPP	ADULTS	1	3		24	6.8(10.1)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	5437	5325	8172	4595	5882.4(1361.1)
AMPHIPODA						
COROPHIUM SPP	ADULTS	168	9	10	183	92.5(83.2)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	378	197	193	483	313.9(125.1)
ORCHESTIA TRASKIANA	ADULTS		4			1.0(1.6)
DECAPODA						
HEMIGRAPSUS OREGONENSIS	ADULTS				1	.3(.5)
HEMIPTERA						
SALDIDAE SPP	NYMPHS	1				.1(.2)
SALDIDAE SPP	ADULTS		1			.3(.5)
DIPTERA						
DIPTERA SPP	PUPAE				3	.6(1.1)
EPHYDRIDAE SPP	LARVAE				8	1.9(3.3)
DOLICHOPODIDAE SPP	LARVAE		10	4	20	8.6(7.7)
CERATOPOGONIDAE SPP	LARVAE		3		4042	1011.2(1753.0)
CHIRONOMIDAE SPP	LARVAE	1	30	9	15	14.0(10.7)
PSYCHODIDAE SPP	LARVAE		30	4		8.6(12.7)
TIPULIDAE SPP	LARVAE		4			1.0(1.6)
TABANIDAE SPP	LARVAE				3	.6(1.1)
	TOTAL	6038	5937	8826	19049	

Table D-23. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Sedge area, 19 December 1977.

AREA SAMPLER SITE SAMPLE		SEDGE LE 01 0004	SEDGE LE 01 0019		
TAXON	LIFE STAGE			MEAN(SD)	
INVERTEBRATES					
OLIGOCHAETA OLIGOCHAETA SPP	ADULTS	152	66	109.2(	43.2)
ARANEAE ARANEAE SPP	ADULTS	18		8.9(	8.9)
ACARINA ACARINA SPP	ADULTS	29		14.6(	14.6)
CUMACEA HEMILEUCON SPP	ADULTS	8	4	5.7(	1.9)
ISOPODA GNORIMOSPHAEROMA LUTEA	ADULTS	86	15	50.8(	35.6)
AMPHIPODA ANISOGAMMARUS CONFERVICOLUS	ADULTS	42	19	30.5(	11.4)
TRICHOPTERA LIMNEPHILIDAE SPP	LARVAE		3	1.3(	1.3)
LEPIDOPTERA PYRALIDAE SPP	LARVAE	1		.6(	.6)
DIPTERA CHIRONOMIDAE SPP	LARVAE	1		.6(	.6)
PSYCHODIDAE SPP	LARVAE	145	1	73.0(	71.8)
TIPULIDAE SPP	LARVAE	4		1.9(	1.9)
	TOTAL	480	108		

Table D-24. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Sedge area, 6 February 1978.

AREA / SAMPLER / SITE / SAMPLE		SEDGE / LE / 01 / 0026	SEDGE / LE / 01 / 0027	SEDGE / LE / 01 / 0046	SEDGE / LE / 01 / 0065	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		4			1.0(1.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	734	3057	390	1882	1515.7(1047.4)
ARANEAE						
ARANEAE SPP	ADULTS	6	15	6	5	8.3(4.1)
ACARINA						
ACARINA SPP	ADULTS	989	1050	559	2281	1219.8(641.2)
MYSIDACEA						
NEOMYSIS MERCEDIS	ADULTS				3	.6(1.1)
CUMACEA						
CUMACEA SPP	ADULTS		23			5.7(9.9)
HEMILEUCON SPP	ADULTS	185	6	72	593	214.3(227.9)
CUMELLA SPP	ADULTS	14	11	9	18	13.0(3.3)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	234	342	161	575	328.0(156.6)
AMPHIPODA						
AMPHIPODA SPP	ADULTS		5		1	1.6(2.1)
COROPHIUM SPP	ADULTS	28	19	170	187	101.0(77.8)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	217	109	344	881	388.0(296.8)
ORCHESTIA TRASKIANA	ADULTS			1		.3(.5)
HOMOPTERA						
APHIDIDAE SPP	ADULTS			4		1.0(1.6)
TRICHOPTERA						
LIMNEPHILIDAE SPP	LARVAE	5	15	6	4	7.6(4.5)
LEPIDOPTERA						
PYRALIDAE SPP	LARVAE	1	5	9	14	7.3(4.7)
DIPTERA						
EPHYDRIDAE SPP	ADULTS			1		.3(.5)
MUSCIDAE SPP	LARVAE	5	17	3	11	8.9(5.5)
DOLICHOPODIDAE SPP	LARVAE		15	1	3	4.8(6.1)
CERATOPOGONIDAE SPP	LARVAE	191	307	56	580	283.5(193.1)
CHIRONOMIDAE SPP	LARVAE	52	46	48	30	44.1(8.2)
PSYCHODIDAE SPP	LARVAE	671	1063	418	2004	1038.9(602.8)
TIPULIDAE SPP	LARVAE	4	10			3.5(4.2)
FISH						
UNIDENTIFIED						
FISH SPP	LARVAE	1				.3(.5)
	TOTAL	3337	6119	2258	9072	

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Table D-25. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Sedge area, 6 April 1978.

AREA / SAMPLER / SITE / SAMPLE		SEDGE LE 01 8036	SEDGE LE 01 8059	SEDGE LE 01 8060	SEDGE LE 01 8088	SEDGE LE 01 8096		
TAXON	LIFE STAGE						MEAN	(SD)
INVERTEBRATES								
CNIDARIA								
CNIDARIA SPP	ADULTS	5	1	18	5	20	9.9(	7.6)
NEMATODA								
NEMATODA SPP	ADULTS	523	175	211	133	385	284.7(	147.3)
POLYCHAETA								
NEANTHES LIMNICOLA	ADULTS	1					.3(	.5)
OLIGOCHAETA								
OLIGOCHAETA SPP	ADULTS	1216	1182	659	853	1078	997.5(	211.1)
ARANEAE								
ARANEAE SPP	ADULTS	9	17	6	3		6.3(	5.7)
ACARINA								
ACARINA SPP	ADULTS	2318	2687	1969	1234	1356	1912.4(	554.9)
OSTRACODA								
OSTRACODA SPP	ADULTS		37		1		7.6(	14.6)
COPEPODA								
HARPACTACOIDA SPP	ADULTS	23	230	17	33	366	133.6(	142.1)
CUMACEA								
HEMILEUCON SPP	ADULTS	130	65	213	603	735	349.3(	266.8)
CUMELLA SPP	ADULTS		1			1	.5(	.6)
ISOPODA								
ISOPODA SPP	ADULTS				46		9.1(	18.3)
GNORIMOSPHAEROMA LUTEA	ADULTS	25	27	72		98	44.5(	35.4)
AMPHIPODA								
COROPHIUM SPP	ADULTS	3	4	6	1	4	3.6(	1.7)
ANISOGAMMARUS CONFERVICOLUS	ADULTS				1	6	1.5(	3.0)
DECAPODA								
DECAPODA SPP	MEGALOPS	1					.3(	.5)
INSECTA								
INSECTA SPP	UNSPECIFIED		1				.3(	.5)
INSECTA SPP	LARVAE					1	.3(	.5)
THYSANOPTERA								
THYSANOPTERA SPP	ADULTS					3	.5(	1.0)
HOMOPTERA								
HOMOPTERA SPP	ADULTS	3	1		1		1.0(	1.0)
COLEOPTERA								
COLEOPTERA SPP	ADULTS		1				.3(	.5)
TRICHOPTERA								
LIMNEPHILIDAE SPP	LARVAE			1		3	.8(	1.0)
LEPIDOPTERA								
PYRALIDAE SPP	LARVAE	4	9	3	1		3.3(	3.1)
DIPTERA								
DIPTERA SPP	PUPAE	918	857	838	664	507	757.3(	150.3)
DIPTERA SPP	LARVAE		1		3	1	1.0(	1.9)
DIPTERA SPP	ADULTS				3		.5(	1.2)
MUSCIDAE SPP	LARVAE	4	1				1.3(	1.5)
DOLICHOPODIDAE SPP	LARVAE		5	1	5	6	3.6(	2.5)
DOLICHOPODIDAE SPP	ADULTS	3					.5(	1.3)
CERATOPOGONIDAE SPP	LARVAE	363	177	212	131	188	214.1(	79.1)
CHIRONOMIDAE SPP	LARVAE	36	37	52	33	67	46.2(	12.1)
CHIRONOMIDAE SPP	ADULTS	11	4	5			4.1(	4.2)
PSYCHODIDAE SPP	LARVAE	13	13	10	23	25	16.9(	6.1)
PSYCHODIDAE SPP	ADULTS	1				1	.5(	.6)
CULICIDAE SPP	ADULTS			1			.3(	.5)
TIPULIDAE SPP	LARVAE	1		1			.5(	.6)
TIPULIDAE SPP	ADULTS					1	.3(	.5)
TABANIDAE SPP	LARVAE	1			1		.5(	.6)
FISH								
UNIDENTIFIED FISH SPP	LARVAE		1					
	TOTAL	5610	5534	4295	3783	4654		

Table D-26. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Sedge area, 16 October 1978.

AREA SAMPLER SITE SAMPLE		SEDGE LE 01 0015	SEDGE LE 01 0053	SEDGE LE 01 0070	SEDGE LE 01 0493	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	255	677	532	1334	699.5(396.2)
ARANEAE						
ARANEAE SPP	ADULTS	66	83	62	72	70.8(7.7)
ACARINA						
ACARINA SPP	ADULTS	889	2584	949	1190	1403.8(691.3)
ISOPODA						
ISOPODA SPP	ADULTS			6		1.6(2.7)
GNORIMOSPHAEROMA LUTEA	ADULTS	38	58	99	30	56.5(26.6)
AMPHIPODA						
COROPHIUM SPP	ADULTS		3		1	1.0(1.1)
TALITRIDAE SPP	ADULTS	3		6		2.2(2.6)
ORCHESTIA TRASKIANA	ADULTS	5	5	9		4.8(3.2)
HEMIPTERA						
SALDIDAE SPP	ADULTS		4			1.0(1.6)
HOMOPTERA						
HOMOPTERA SPP	ADULTS				1	.3(.5)
DELPHACIDAE SPP	ADULTS	8			10	4.4(4.5)
COLEOPTERA						
COCCINELLIDAE SPP	ADULTS			5		1.3(2.2)
CARABIDAE SPP	ADULTS			1		.3(.5)
LEPIDOPTERA						
PYRALIDAE SPP	LARVAE		3			.6(1.1)
DIPTERA						
DIPTERA SPP	PUPAE	1			21	5.4(8.6)
DIPTERA SPP	LARVAE	3			6	2.2(2.6)
DIPTERA SPP	ADULTS		3	1	14	4.4(5.6)
EPHYDRIDAE SPP	LARVAE				1	.3(.5)
MUSCIDAE SPP	LARVAE	6		6	4	4.1(2.6)
DOLICHOPODIDAE SPP	LARVAE	3		3	13	4.4(4.9)
CERATOPOGONIDAE SPP	LARVAE			3	5	1.9(2.1)
CHIRONOMIDAE SPP	LARVAE	1	5	15	23	11.1(8.5)
PSYCHODIDAE SPP	LARVAE	586	1382	677	770	853.1(312.2)
TIPULIDAE SPP	LARVAE	4		5		2.2(2.3)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS	1			3	1.0(1.1)
	TOTAL	1867	4807	2379	3497	

Table D-27. Density (number per m^2) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the Immature High area, 7 February 1978.

AREA / SAMPLER / SITE / SAMPLE		IM HI / LE / 01 / 0000	IM HI / LE / 01 / 0025	IM HI / LE / 01 / 0026	IM HI / LE / 01 / 0092		
TAXON	LIFE STAGE					MEAN(SD)	
INVERTEBRATES							
TURBELLARIA							
TURBELLARIA SPP	ADULTS	33		6	1	10.2(	13.4)
NEMATODA							
NEMATODA SPP	ADULTS			9		2.2(	3.8)
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	635	229	138	458	65.1(	194.7)
GASTROPODA							
GASTROPODA SPP	ADULTS	11			1	3.2(	4.8)
ARTHROPODA							
ARTHROPODA SPP	UNSPECIFIED	1		25		6.7(	10.8)
ARANEAE							
ARANEAE SPP	ADULTS	91	32	17	26	41.3(	29.1)
ACARINA							
ACARINA SPP	ADULTS	36	8	171	19	59.1(	65.8)
COPEPODA							
CALANOIDA SPP	ADULTS			3		.6(	1.1)
HARPACTICOIDA SPP	ADULTS			11		2.3(	4.9)
CUMACEA							
CUMELLA SPP	ADULTS	19	11	30	22	20.6(	6.8)
ISOPODA							
ONISCIDAE SPP	ADULTS				1	.3(	.5)
PORCELLIO SCABER	ADULTS	30	1			7.3(	13.3)
LIGIDIUM GRACILIS	ADULTS	14	3	6		6.7(	6.8)
AMPHIPODA							
GAMMARIDEA SPP	ADULTS	5				1.3(	2.2)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	4	6	6	15	7.3(	4.3)
TALITRIDAE SPP	ADULTS	1		1	1	1.0(	.5)
ORCHESTIA TRASKIANA	ADULTS	1	4	5	9	4.9(	2.7)
INSECTA							
INSECTA SPP	UNSPECIFIED			1		.3(	.5)
INSECTA SPP	PUPAE				1	.3(	.5)
INSECTA SPP	LARVAE	3				.6(	1.1)
INSECTA SPP	ADULTS	1				.3(	.5)
COLLEMBOLA							
COLLEMBOLA SPP	ADULTS				1	.3(	.5)
ISOTOMIDAE SPP	ADULTS	3				.6(	1.1)
PODURIDAE SPP	ADULTS	4	3	72		19.7(	30.5)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS	10	3	4	3	4.8(	3.2)
HOMOPTERA							
HOMOPTERA SPP	ADULTS	1				.3(	.5)
DELPHACIDAE SPP	ADULTS	20		3		5.7(	9.5)
CICADELLIDAE SPP	ADULTS	3	5	15	3	6.4(	5.2)
COLEOPTERA							
COLEOPTERA SPP	LARVAE	8	5	6	3	5.4(	1.3)
COLEOPTERA SPP	ADULTS	4		5		2.2(	2.3)
PSELAPHIDAE SPP	ADULTS	6	1	5		2.9(	2.4)
CARABIDAE SPP	ADULTS	13	3	4	1	5.1(	4.5)
LIMNEBIIDAE SPP	ADULTS			1	9	2.5(	3.7)
CHRYSOMELIDAE SPP	ADULTS	1	1	1		1.0(	.5)
HYDROPHILIDAE SPP	ADULTS	5		1	17	5.7(	6.5)
TRICHOPTERA							
LIMNEPHILIDAE SPP	LARVAE				5	1.3(	2.2)
LEPIDOPTERA							
LEPIDOPTERA SPP	LARVAE	1				.3(	.5)
DIPTERA							
DIPTERA SPP	PUPAE	3		1		1.0(	1.1)
DIPTERA SPP	LARVAE	98	23	4		31.1(	39.5)
DIPTERA SPP	ADULTS	1				.3(	.5)
MUSCIDAE SPP	LARVAE	5			17	5.4(	6.7)
DOLICHOPODIDAE SPP	LARVAE	25	6	17	43	22.4(	13.5)
CERATOPOGONIDAE SPP	LARVAE		3			.6(	1.1)
CHIRONOMIDAE SPP	LARVAE	42	6	56	169	68.3(	63.9)
MYCETOPHILIDAE SPP	LARVAE	48		9	58	28.3(	24.2)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	1				.3(	.5)
FORMICIDAE SPP	ADULTS		1			.3(	.5)
CHILOPODA							
CHILOPODA SPP	ADULTS				1	.3(	.5)
	TOTAL	1193	354	632	884		

Table D-28. Number of animals taken by AN (non-quantitative) in a large pan of the Immature High area, 7 April 1978.

AREA		IM HI
SAMPLER		AN
SITE		01
SAMPLE		0001
TAXON	LIFE STAGE	
INVERTEBRATES		
OLIGOCHAETA		
OLIGOCHAETA SPP	ADULTS	118
COPEPODA		
CALANOIDA SPP	ADULTS	166
HARPACTACOIDA SPP	ADULTS	416
CUMACEA		
CUMELLA SPP	ADULTS	1
AMPHIPODA		
COROPHIUM SPP	ADULTS	1
ANISOGAMMARUS CONFERVICOLUS	ADULTS	350
AMPITHOE SPP	ADULTS	1
ODONATA		
ODONATA SPP	NYMPHS	4
HEMIPTERA		
CORIXIDAE SPP	ADULTS	1
TRICHOPTERA		
LIMNEPHILIDAE SPP	LARVAE	2
DIPTERA		
DIPTERA SPP	ADULTS	1
EPHYDRIDAE SPP	LARVAE	1
MUSCIDAE SPP	LARVAE	3
CHIRONOMIDAE SPP	LARVAE	14
FISH		
GASTEROSTEIDAE		
GASTEROSTEUS ACULEATUS	ADULTS	1
	TOTAL	1080

Table D-29. Number of animals taken by AN (non-quantitative) in three pans of the Mature High area. Site 15 was sampled on 1 November 1978, and sites 17 and 18 on 12 April 1979.

AREA / SAMPLER / SITE / SAMPLE		MAT HI / AN / 15 / 0001	MAT HI / AN / 17 / 0001	MAT HI / AN / 18 / 0001	MEAN(SD)	
TAXON	LIFE STAGE					
INVERTEBRATES						
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS			1	.3(	.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	11	1298	71	460.0(	593.1)
COPEPODA						
CALANOIDA SPP	ADULTS			33	11.0(	15.6)
CUMACEA						
HEMILEUCON SPP	ADULTS			14	4.7(	6.6)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	1			.3(	.5)
AMPHIPODA						
COROPHIUM SPP	ADULTS	1		29	10.0(	13.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS		60	61	40.3(	28.5)
HEMIPTERA						
CORIXIDAE SPP	ADULTS	96		1	32.3(	45.0)
COLEOPTERA						
COLEOPTERA SPP	LARVAE			1	.3(	.5)
LIMNEBIIDAE SPP	ADULTS		48	1	16.3(	22.4)
HYDROPHILIDAE SPP	ADULTS			1	.3(	.5)
TRICHOPTERA						
LIMNEPHILIDAE SPP	LARVAE			4	1.3(	1.9)
DIPTERA						
DIPTERA SPP	PUPAE		6		2.0(	2.8)
EPHYDRIDAE SPP	LARVAE		716	3	239.7(	336.8)
MUSCIDAE SPP	LARVAE			1	.3(	.5)
DOLICHOPODIDAE SPP	LARVAE		2		.7(	.9)
CERATOPOGONIDAE SPP	LARVAE	1	2	1	1.3(	.5)
CHIRONOMIDAE SPP	LARVAE	12	14	3	9.7(	4.8)
CULICIDAE SPP	LARVAE		438		146.0(	206.5)
TABANIDAE SPP	LARVAE		4		1.3(	1.9)
FISH						
UNIDENTIFIED						
FISH SPP	LARVAE			48	16.0(	22.6)
	TOTAL	122	2588	273		

Table D-30. Density (number per m^2) of small infauna in a tidal creek of the Sedge area, 24 June 1978. Four SC samples each 10 cm deep were collected at sampling point 01, and screened on a 0.5 mm sieve.

AREA SAMPLER SITE SAMPLE		SEDGE SC 01 0101	SEDGE SC 01 0102	SEDGE SC 01 0103	SEDGE SC 01 0104	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	987	2467	1480	1480	1603.5(537.6)
NEMATODA						
NEMATODA SPP	ADULTS	2960	30590	9868		10854.4(11943.5)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	23189	20229	40457	493	21092.0(14181.5)
NEREIDAE SPP	ADULTS			987		246.7(427.3)
PSEUDOPOLYDORA SPP	ADULTS			493		123.3(213.6)
HOBSONIA FLORIDA	ADULTS	11841	9374	6907	2467	7647.4(3462.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	146507	138640	343392	79928	177616.8(99236.2)
BIVALVIA						
MACOMA BALTHICA	ADULTS	493	493			246.7(246.7)
ACARINA						
ACARINA SPP	ADULTS		493			123.3(213.6)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	987	23189	3947		7030.7(9441.3)
CUMACEA						
HEMILEUCON SPP	ADULTS	10361	7401	4440	5427	6907.3(2261.0)
CUMELLA SPP	ADULTS	493	493	987		493.4(348.9)
AMPHIPODA						
COROPHIUM SPP	ADULTS	5921	13815	16282	6907	10731.0(4418.1)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	987	987	2960	987	1480.1(854.6)
FISH						
COTTIDAE						
ENOPHRYS BISON	ADULTS				7894	1973.5(3418.2)
	TOTAL	206726	248171	432200	105583	

Table D-31. Density (number per m^2) of small infauna in a tidal creek of the Sedge area, 24 June 1978. Four SC samples each 10 cm deep were collected at sampling point 02, and screened on a 0.5 mm sieve.

AREA / SAMPLER / SITE / SAMPLE		SEDGE SC 01 0201	SEDGE SC 01 0202	SEDGE SC 01 0203	SEDGE SC 01 0204	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	1974				493.4(854.6)
NEMATODA						
NEMATODA SPP	ADULTS	4440		2467	6414	3330.3(2375.8)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	13321		6907	11348	7894.1(5115.5)
HOBSONIA FLORIDA	ADULTS	7894	1974	8387	2467	5180.5(2970.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	189458	4440	72527	146534	103239.8(70732.8)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	4934		1480	3454	2466.9(1878.7)
CUMACEA						
HEMILEUCON SPP	ADULTS	13815	3947	10361	9868	9497.6(3547.1)
CUMELLA SPP	ADULTS	493			493	246.7(246.7)
AMPHIPODA						
COROPHIUM SPP	ADULTS	22202	9374	7894	9374	12211.2(5799.8)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	3947	987	3454	493	2220.2(1500.6)
DIPTERA						
CHIRONOMIDAE SPP	LARVAE	493				123.3(213.6)
	TOTAL	262971	20722	113477	190445	

Table D-32. Density (number per m^2) of small infauna in a tidal creek of the Sedge area, 24 June 1978. Four SC samples each 10 cm deep were collected at sampling point 03, and screened on a 0.5 mm sieve.

AREA SAMPLER SITE SAMPLE		SEDGE SC 01 0301	SEDGE SC 01 0302	SEDGE SC 01 0303	SEDGE SC 01 0304	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		987	493	987	616.7(409.1)
NEMATODA						
NEMATODA SPP	ADULTS	10654	17762	3454	3947	9004.2(5841.7)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	23189	2960	3454	987	7647.4(9020.2)
ETEONE SPP	ADULTS	987				246.7(427.3)
PSEUDOPOLYDORA SPP	ADULTS	493				123.3(213.6)
HOBSONIA FLORIDA	ADULTS	5427	5427	4440		3823.7(2244.1)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	137653	111010	129206	60192	109530.4(30069.9)
BIVALVIA						
MACOMA BALTHICA	ADULTS	493				123.3(213.6)
OSTRACODA						
OSTRACODA SPP	ADULTS		493	493		246.7(246.7)
COPEPODA						
CYCLOPOIDA SPP	ADULTS		493			123.3(213.6)
HARPACTACOIDA SPP	ADULTS	8387	16775	17762	1480	11101.0(6642.3)
CUMACEA						
HEMILEUCON SPP	ADULTS	10854	13815	12334	2467	9867.6(4399.1)
AMPHIPODA						
COROPHIUM SPP	ADULTS	27136	21709	23189	11348	20845.3(5831.2)
ANISOGAMMARUS CONFERVICOLUS	ADULTS		987	4440		1356.8(1825.3)
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE		987			246.7(427.3)
	TOTAL	225473	193405	199325	81408	

Table D-33. Density (number per m^2) of small infauna in a tidal creek of the Sedge area, 24 June 1978. Four SC samples each 10 cm deep were collected at sampling point 05, and screened on a 0.5 mm sieve.

AREA SAMPLER SITE SAMPLE		SEDGE SC 01 0501	SEDGE SC 01 0502	SEDGE SC 01 0503	SEDGE SC 01 0504	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		4934	4440	6414	3947.0(2391.7)
NEMATODA						
NEMATODA SPP	ADULTS	1974	9868	9374	3947	6290.6(3407.1)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS		8387	2467		2713.6(3427.1)
NEANTHES LIMNICOLA	ADULTS		493			123.3(213.6)
HOBSONIA FLORIDA	ADULTS	1974	5921	3947	6414	4563.8(1757.4)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	201792	286160	116931	133706	184647.5(66669.7)
GASTROPODA						
GASTROPODA SPP	ADULTS		987		1974	740.1(818.2)
OSTRACODA						
OSTRACODA SPP	ADULTS		1974	493	493	740.1(740.1)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	987	1480	4934	1480	2220.2(1579.6)
CUMACEA						
HEMILEUCON SPP	ADULTS	987		493		370.0(409.1)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS		493			123.3(213.6)
AMPHIPODA						
COROPHIUM SPP	ADULTS	6414	27136	22202	22695	19611.9(7858.3)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	493	2960	1974	493	1480.1(1046.6)
INSECTA						
INSECTA SPP	PUPAE				493	123.3(213.6)
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE	493	493		1974	740.1(740.1)
	TOTAL	215114	351286	167255	180083	

Table D-34. Density (number per m^2) of small infauna in a tidal creek of the Sedge area, 24 June 1978. Four SC samples each 10 cm deep were collected at sampling point 06, and screened on a 0.5 mm sieve.

AREA SAMPLER SITE SAMPLE		SEDGE SC 01 0601	SEDGE SC 01 0602	SEDGE SC 01 0603	SEDGE SC 01 0604	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	1974		2467	2960	1850.2(1123.7)
NEMATODA						
NEMATODA SPP	ADULTS	4934	12828	9374	3947	7770.7(3564.2)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	26149	15788	22202	18255	20598.6(3337.4)
NEANTHES LIMNICOLA	ADULTS	493			493	246.7(246.7)
HOBSONIA FLORIDA	ADULTS	10854	11348	9868	16775	12211.2(2688.2)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	236329	239289	178604	158375	203149.2(35405.6)
BIVALVIA						
MACOMA BALTHICA	ADULTS		493			123.3(213.6)
OSTRACODA						
OSTRACODA SPP	ADULTS			493	493	246.7(246.7)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	6414	15788	16775	987	9990.9(6586.0)
CUMACEA						
HEMILEUCON SPP	ADULTS	3947	7401	4440	5427	5303.8(1322.7)
CUMELLA SPP	ADULTS				987	246.7(427.3)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			493		123.3(213.6)
AMPHIPODA						
COROPHIUM SPP	ADULTS	17268	14801	19735	20229	18008.4(2164.7)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	1480	1974	6414		2466.9(2391.7)
	TOTAL	309842	319710	270865	228928	

Table D-35. Density (number per m^2) of small infauna in a tidal creek of the Sedge area, 24 June 1978. Four SC samples each 10 cm deep were collected at sampling point 08, and screened on a 0.5 mm sieve.

AREA SAMPLER SITE SAMPLE		SEDGE SC 01 0801	SEDGE SC 01 0802	SEDGE SC 01 0803	SEDGE SC 01 0804	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
UNSPECIFIED						
UNSPECIFIED SPP	UNSPECIFIED				493	123.3(213.6)
CNIDARIA						
CNIDARIA SPP	ADULTS			987	1480	616.7(640.9)
NEMATODA						
NEMATODA SPP	ADULTS	987	8881	9374	7894	6784.0(3389.2)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	3454	18255	8387	6414	9127.5(5554.6)
HOBSONIA FLORIDA	ADULTS	5427	4440	7894	4934	5673.9(1328.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	48845	65620	140120	126799	95345.7(38858.8)
BIVALVIA						
MACOMA BALTHICA	ADULTS		493	493	493	370.0(213.6)
ACARINA						
ACARINA SPP	ADULTS		493			123.3(213.6)
COPEPODA						
HARPACTACOIDA SPP	ADULTS		1480	5427	2467	2343.6(1985.0)
CUMACEA						
HEMILEUCON SPP	ADULTS	8881	1480	3454	3454	4317.1(2755.3)
CUMELLA SPP	ADULTS	493		493		246.7(246.7)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			1480	987	616.7(640.9)
AMPHIPODA						
COROPHIUM SPP	ADULTS	2467	2960	9868	6414	5427.2(2980.8)
ANISOGAMMARUS CONFERVICOLUS	ADULTS			1974	493	616.7(808.8)
HOMOPTERA						
APHIDIDAE SPP	ADULTS				493	123.3(213.6)
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE				493	123.3(213.6)
	TOTAL	70554	104102	189951	163308	

Table D-36. Density (number per m^2) of large infauna in a tidal creek of the Sedge area, 24 June 1978. A 30 cm deep sample was taken by LC at each of six sampling points. The samples were screened on a 2 mm sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		LC	LC	LC	LC	LC	LC	
SITE		16	16	16	16	16	16	
SAMPLE		0101	0201	0301	0501	0601	0801	
TAXON	LIFE STAGE							MEAN(SD)
INVERTEBRATES								
BIVALVIA								
MACOMA BALTHICA	ADULTS	55	713	219		55	329	228.4(244.0)
	TOTAL	55	713	219		55	329	

Table D-37. Density (number per m^2) of small infauna in a tidal creek of the Mature High area, 1 November 1978. Four samples each 10 cm deep were collected at sampling point 01, and screened on a 0.5 mm sieve.

AREA / SAMPLER / SITE / SAMPLE		MAT HI SC 14 0101	MAT HI SC 14 0102	MAT HI SC 14 0103	MAT HI SC 14 0104	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS			1974	493	616.7(808.8)
NEMERTEA						
NEMERTEA SPP	ADULTS		987			246.7(427.3)
NEMATODA						
NEMATODA SPP	ADULTS			987	1480	616.7(640.9)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	493	5921	21709	10654	9744.3(7819.5)
AMPHARETIDAE SPP	ADULTS			1974		493.4(854.6)
POLYDORA SPP	ADULTS			1480	493	493.4(604.3)
PYGOSPIO SPP	ADULTS				493	123.3(213.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	11348	12828	13321	28123	16404.9(6804.1)
TANAIDACEA						
TANAIDACEA SPP	ADULTS				493	123.3(213.6)
PANCOLUS SPP	ADULTS			493		123.3(213.6)
AMPHIPODA						
COROPHIUM SPP	ADULTS			6414	987	1850.2(2665.5)
ANISOGAMMARUS CONFERVICOLUS	ADULTS			987		246.7(427.3)
TALITRIDAE SPP	ADULTS			2960		740.1(1281.8)
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE			21215	493	5427.2(9117.5)
CHIRONOMIDAE SPP	LARVAE			493		123.3(213.6)
	TOTAL	11841	19736	74007	43909	

Table D-38. Density (number per m^2) of small infauna in a tidal creek of the Mature High area, 1 November 1978. Four SC samples each 10 cm deep were collected at sampling point 02 and screened on a 0.5 mm sieve.

AREA / SAMPLER / SITE / SAMPLE		MAT HI SC 14 0201	MAT HI SC 14 0202	MAT HI SC 14 0203	MAT HI SC 14 0204	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	1974	6907		3454	3083.6(2524.8)
NEMATODA						
NEMATODA SPP	ADULTS		1480			370.0(640.9)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	987	987	6414	987	2343.6(2350.0)
AMPHARETIDAE SPP	ADULTS	1974	1480	493		986.8(780.1)
POLYDORA SPP	ADULTS	987	493	493		493.4(348.9)
PSEUDOPOLYDORA SPP	ADULTS	987				246.7(427.3)
PYGOSPIO SPP	ADULTS		493			123.3(213.6)
STREBLOSPIO SPP	ADULTS	3454	2960	493		1726.8(1500.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	14308	39470	28616	1480	20968.7(14361.1)
TANAIDACEA						
TANAIDACEA SPP	ADULTS			493		123.3(213.6)
AMPHIPODA						
COROPHIUM SPP	ADULTS	493	493	987	987	740.1(246.7)
AMPITHOE SPP	ADULTS				493	123.3(213.6)
	TOTAL	25164	54763	37989	7401	

Table D-39. Density (number per m^2) of small infauna in a tidal creek of the Mature High area, 1 November 1978. Four SC samples each 10 cm deep were collected at sampling point 03 and screened on a 0.5 mm sieve.

AREA SAMPLER SITE SAMPLE		MAT HI SC 14 0301	MAT HI SC 14 0302	MAT HI SC 14 0303	MAT HI SC 14 0304	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS			3454	5427	2220.2(2327.3)
NEMATODA						
NEMATODA SPP	ADULTS				1480	370.0(640.9)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS		987	2467	23682	6784.0(9795.6)
AMPHARETIDAE SPP	ADULTS		987	5427	19242	6413.9(7683.1)
SPIONIDAE SPP	ADULTS				7694	1973.5(3418.2)
PSEUDOPOLYDORA SPP	ADULTS			987		246.7(427.3)
STREBLOSPIO SPP	ADULTS			493		123.3(213.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	6414	93249	28123	25162	38236.9(32833.9)
CUMACEA						
HEMILEUCON SPP	ADULTS		493	987		370.0(409.1)
TANAIDACEA						
PANCOLUS SPP	ADULTS		493	987	6414	1973.5(2587.3)
AMPHIPODA						
COROPHIUM SPP	ADULTS		1480	36510	44404	20598.6(20060.5)
GAMMARIDEA SPP	ADULTS			493	987	370.0(409.1)
ANISOGAMMARUS CONFERVICOLUS	ADULTS			987		246.7(427.3)
TALITRIDAE SPP	ADULTS			2467		616.7(1068.2)
AMPITHOE SPP	ADULTS				493	123.3(213.6)
DIPTERA						
DIPTERA SPP	ADULTS		493			123.3(213.6)
DOLICHOPODIDAE SPP	LARVAE	493				123.3(213.6)
CERATOPOGONIDAE SPP	LARVAE	493	493		493	370.0(213.6)
CHIRONOMIDAE SPP	LARVAE		493		7401	1973.5(3139.9)
	TOTAL	7400	99168	83382	143079	

Table D-40. Density (number per m^2) of small infauna in a tidal creek of the Mature High area, 1 November 1978. Four SC samples each 10 cm deep were collected at the sampling point 04 and screened on a 0.5 mm sieve.

AREA SAMPLER SITE SAMPLE		MAT HI SC 14 0401	MAT HI SC 14 0402	MAT HI SC 14 0403	MAT HI SC 14 0404	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
OLIGOCHAETA OLIGOCHAETA SPP	ADULTS		987		2960	986.8(1208.5)
TANAIDACEA PANCOLUS SPP	ADULTS				987	246.7(427.3)
	TOTAL		987		3947	

Table D-41. Results of sampling for large infauna in a tidal creek of the Mature High area, 1 November 1978. No large infauna were found in any of five 30 cm deep samples taken by LC. Samples were screened on a 2 mm sieve.

AREA		MAT HI	MAT HI	MAT HI	MAT HI	MAT HI
SAMPLER		LC	LC	LC	LC	LC
SITE		14	14	14	14	14
SAMPLE		0101	0201	0301	0401	0501
TAXON	LIFE STAGE					
INVERTEBRATES		(none captured)				

Table D-42. Number of animals taken by AN (non-quantitative) in two small creeks of the Sedge area, 6 April 1978.

AREA SAMPLER SITE SAMPLE		SEDGE AN 01 0001	SEDGE AN 02 0001	
TAXON	LIFE STAGE			MEAN(SD)
INVERTEBRATES				
CNIDARIA				
CNIDARIA SPP	ADULTS	100	27	63.5(36.5)
NEMERTEA				
NEMERTEA SPP	ADULTS	1		.5(.5)
NEMATODA				
NEMATODA SPP	ADULTS	5	6	5.5(.5)
POLYCHAETA				
CAPITELLIDAE SPP	ADULTS	1	104	52.5(51.5)
PSEUDOPOLYDORA SPP	ADULTS		7	3.5(3.5)
PYGOSPIO SPP	ADULTS		43	21.5(21.5)
HOBSONIA FLORIDA	ADULTS	25	63	44.0(19.0)
OLIGOCHAETA				
OLIGOCHAETA SPP	ADULTS	291	71	181.0(110.0)
BIVALVIA				
BIVALVIA SPP	LARVAE	1		.5(.5)
BIVALVIA SPP	JUVENILES		2	1.0(1.0)
ARANEAE				
ARANEAE SPP	ADULTS	4	1	2.5(1.5)
ACARINA				
ACARINA SPP	ADULTS	26	3	14.5(11.5)
OSTRACODA				
OSTRACODA SPP	ADULTS	3	1	2.0(1.0)
COPEPODA				
HARPACTACOIDA SPP	ADULTS	13	2	7.5(5.5)
CUMACEA				
HEMILEUCON SPP	ADULTS	72	216	144.0(72.0)
ISOPODA				
GNORIMOSPHAEROMA LUTEA	ADULTS	101	13	57.0(44.0)
AMPHIPODA				
COROPHIUM SPP	ADULTS	56	455	257.5(201.5)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	80	55	67.5(12.5)
HEMIPTERA				
SALDIDAE SPP	NYMPHS	1		.5(.5)
DIPTERA				
DIPTERA SPP	PUPAE	12		6.0(6.0)
DIPTERA SPP	ADULTS		2	1.0(1.0)
CERATOPOGONIDAE SPP	LARVAE	76	12	44.0(32.0)
CHIRONOMIDAE SPP	LARVAE	7		3.5(3.5)
CHIRONOMIDAE SPP	ADULTS	3		1.5(1.5)
PSYCHODIDAE SPP	LARVAE	1		.5(.5)
PSYCHODIDAE SPP	ADULTS	2		1.0(1.0)
CULICIDAE SPP	ADULTS	8		4.0(4.0)
TIPULIDAE SPP	LARVAE	1	1	1.0(0)
FISH				
COTTIDAE				
LEPTOCOTTUS ARMATUS	ADULTS	1		.5(.5)
	TOTAL	891	1088	

Table D-43. Number of animals taken by AN (non-quantitative) at five sampling points in a tidal creek of the Sedge area, 21 July 1978.

AREA / SAMPLER / SITE / SAMPLE		SEDGE AN 03 0101	SEDGE AN 03 0201	SEDGE AN 03 0301	SEDGE AN 03 0601	SEDGE AN 03 0801		
TAXON	LIFE STAGE						MEAN	(SD)
INVERTEBRATES								
CNIDARIA								
CNIDARIA SPP	ADULTS	119	6	6		41	34.4(	66.7)
NEMERTEA								
NEMERTEA SPP	ADULTS			1			.2(	.4)
NEMATODA								
NEMATODA SPP	ADULTS	83	15	19	6	18	28.2(	27.8)
POLYCHAETA								
CAPITELLIDAE SPP	ADULTS	1022	5	37	8	247	263.9(	390.1)
NEANTHES LIMNICOLA	ADULTS	5					1.0(	2.0)
PYGOSPIO SPP	ADULTS			2			.4(	.8)
HOBSONIA FLORIDA	ADULTS	185	7	6	30	37	53.0(	67.1)
OLIGOCHAETA								
OLIGOCHAETA SPP	ADULTS	1111	38	84	29	341	320.6(	411.3)
GASTROPODA								
ALDERIA SPP	ADULTS	26	1	10		25	12.4(	11.3)
ARANEAE								
ARANEAE SPP	ADULTS			2	1	3	1.2(	1.2)
ACARINA								
ACARINA SPP	ADULTS	4	6	44	11	18	16.6(	14.5)
OSTRACODA								
OSTRACODA SPP	ADULTS			1		8	1.8(	3.1)
COPEPODA								
CALANOIDA SPP	ADULTS	1					.2(	.4)
HARPACTICOIDA SPP	ADULTS	27	2	7	50	32	23.6(	17.4)
CIRRIPEDIA								
BALANIDAE SPP	ADULTS					1	.2(	.4)
CUMACEA								
CUMACEA SPP	ADULTS				2		.4(	.9)
HEMILEUCON SPP	ADULTS	7	2	44	14	54	24.2(	23.8)
CUMELLA SPP	ADULTS	3					.6(	1.2)
ISOPODA								
GNORIMOSPHAEROMA LUTEA	ADULTS	5	7	52	29	295	77.6(	110.8)
AMPHIPODA								
AMPHIPODA SPP	ADULTS			1			.2(	.4)
COROPHIUM SPP	ADULTS	109	10		34	41	38.8(	38.2)
GAMMARIDEA SPP	ADULTS				1		.2(	.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	2	1	1	1	8	2.6(	2.7)
TALITRIDAE SPP	ADULTS				1		.2(	.4)
DECAPODA								
HEMIGRAPSUS OREGONENSIS	ADULTS					1	.2(	.4)
INSECTA								
INSECTA SPP	LARVAE					1	.2(	.4)
HEMIPTERA								
HEMIPTERA SPP	NYMPHS		2				.4(	.8)
HEMIPTERA SPP	ADULTS		1				.2(	.4)
SALDIDAE SPP	NYMPHS	1		13			2.8(	5.1)
SALDIDAE SPP	ADULTS					10	2.0(	4.0)
HOMOPTERA								
APHIDIDAE SPP	ADULTS	51	44	17	9	18	27.8(	16.5)
COLEOPTERA								
COLEOPTERA SPP	LARVAE	8		1	2	12	4.6(	4.6)
COLEOPTERA SPP	ADULTS					1	.2(	.4)
STAPHYLINIDAE SPP	ADULTS					3	.6(	1.2)
DIPTERA								
DIPTERA SPP	PUPAE	1			1		.4(	.5)
DIPTERA SPP	ADULTS	2	2	3		23	6.0(	8.6)
EPHYDRIDAE SPP	ADULTS				1		.2(	.4)
MUSCIDAE SPP	LARVAE					6	1.2(	2.4)
DOLICHOPODIDAE SPP	LARVAE	2		2		6	2.0(	2.2)
DOLICHOPODIDAE SPP	ADULTS				1		.2(	.4)
CERATOPOGONIDAE SPP	LARVAE	30	1	4	3	5	8.6(	10.8)
CERATOPOGONIDAE SPP	ADULTS					1	.2(	.4)
CHIRONOMIDAE SPP	LARVAE	1			8	1	2.0(	3.0)
PSYCHODIDAE SPP	LARVAE	8		14	23		9.0(	8.8)
PSYCHODIDAE SPP	ADULTS		2				.4(	.5)
TIPULIDAE SPP	ADULTS					3	.6(	1.2)
FISH								
GASTEROSTEIDAE								
GASTEROSTEUS ACULEATUS	ADULTS	1		6	2	4	2.6(	2.2)
	TOTAL	2814	192	373	267	1264		

Table D-44. Number of animals taken by AN (non-quantitative) at three sampling points in a tidal creek of the Mature High area, 1 November 1978.

AREA SAMPLER SITE SAMPLE		MAT HI AN 14 0101	MAT HI AN 14 0201	MAT HI AN 14 0401	
TAXON	LIFE STAGE				MEAN(SD)
INVERTEBRATES					
CNIDARIA					
CNIDARIA SPP	ADULTS		48		16.0(22.6)
POLYCHAETA					
CAPITELLIDAE SPP	ADULTS	15	24		13.0(9.9)
AMPHARETIDAE SPP	ADULTS		12		4.0(5.7)
SPIONIDAE SPP	ADULTS		2	47	16.3(21.7)
POLYDORA SPP	ADULTS		6		2.0(2.8)
PSEUDOPOLYDORA SPP	ADULTS		1		.3(.5)
PYGOSPIO SPP	ADULTS		1		.3(.5)
STREBLOSPIO SPP	ADULTS		27		9.0(12.7)
OLIGOCHAETA					
OLIGOCHAETA SPP	ADULTS	49	40	8	32.3(17.6)
ACARINA					
ACARINA SPP	ADULTS		1		.3(.5)
CIRRIPEDIA					
BALANIDAE SPP	ADULTS			1	.3(.5)
CUMACEA					
HEMILEUCON SPP	ADULTS	1	33		11.3(15.3)
TANAIDACEA					
PANCOLUS SPP	ADULTS	6	5	2	4.3(1.7)
LEPTOCHELIA SPP	ADULTS			1	.3(.5)
ISOPODA					
GNORIMOSPHAEROMA LUTEA	ADULTS		1		.3(.5)
IDOTEIDAE SPP	ADULTS		1	4	1.7(1.7)
IDOTEA RESECATA	ADULTS		2	3	1.7(1.2)
AMPHIPODA					
COROPHIUM SPP	ADULTS	12	31	6	16.3(10.7)
ANISOGAMMARUS CONFERVICOLUS	ADULTS		2	9	3.7(3.9)
TALITRIDAE SPP	ADULTS	3	1	2	2.0(.8)
AMPITHOE SPP	ADULTS	26	11	22	19.7(6.3)
HEMIPTERA					
SALDIDAE SPP	NYMPHS	1			.3(.5)
CORIXIDAE SPP	ADULTS			1	.3(.5)
COLEOPTERA					
COLEOPTERA SPP	ADULTS		1		.3(.5)
DIPTERA					
DOLICHOPODIDAE SPP	LARVAE		1		.3(.5)
CHIRONOMIDAE SPP	LARVAE		2		.7(.9)
TIPULIDAE SPP	LARVAE		2		.7(.9)
FISH					
COTTIDAE					
LEPTOCOTTUS ARMATUS	ADULTS		1		.3(.5)
GASTEROSTEIDAE					
GASTEROSTEUS ACULEATUS	ADULTS	2			.7(.9)
	TOTAL	115	256	106	

Table D-45. Number of animals taken by drift net (non-quantitative) in tidal creeks of the Sedge area. Site 03 (at the mouth of the large creek) was sampled by LD for 6-8 hours through an ebb tide on 16 October 1978 and on 26 April 1979. Sites 01 and 22 are in small creeks and were sampled by SD for one hour on 6 February 1978 (site 01) and for six hours on 26 April 1979 (site 22) during ebb tides.

AREA SAMPLER SITE SAMPLE		SEDGE LD 03 0101	SEDGE LD 03 0102	SEDGE SD 01 0001	SEDGE SD 22 0001		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
CNIDARIA							
CNIDARIA SPP	ADULTS		21			5.3(	9.1)
NEMATODA							
NEMATODA SPP	ADULTS		12	3		3.8(	4.9)
POLYCHAETA							
CAPITELLIDAE SPP	ADULTS	2	45	3		12.5(	18.8)
NEANTHES LIMNICOLA	ADULTS		1			.3(	.4)
HOBSONIA FLORIDA	ADULTS		5	3		2.0(	2.1)
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	23	98	57		44.5(	36.9)
GASTROPODA							
GASTROPODA SPP	ADULTS	5				1.3(	2.2)
ALDERIA SPP	ADULTS		1			.3(	.4)
ARANEAE							
ARANEAE SPP	ADULTS			1		.3(	.4)
ACARINA							
ACARINA SPP	ADULTS	40	153	1	1	48.8(	62.3)
OSTRACODA							
OSTRACODA SPP	ADULTS	3	1			1.0(	1.2)
COPEPODA							
CALANOIDA SPP	ADULTS	2	14			4.0(	5.3)
HARPACTACOIDA SPP	ADULTS		25	35		15.0(	15.4)
MYSIDACEA							
NEOMYSIS MERCEDIS	ADULTS	1	1			.5(	.5)
CUMACEA							
HEMILEUCON SPP	ADULTS	18	833	1		213.0(	358.0)
CUMELLA SPP	ADULTS	1	30	1		8.0(	12.7)
ISOPODA							
GNORIMOSPHAEROMA LUTEA	ADULTS	1		13		3.5(	5.5)
AMPHIPODA							
COROPHIUM SPP	ADULTS	15	38	270		80.8(	110.1)
GAMMARIDEA SPP	ADULTS	1				.3(	.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	13	594	28		160.3(	250.6)
DECAPODA							
DECAPODA SPP	ZOEA	21	5	1		6.8(	8.4)
DECAPODA SPP	MEGALOPS	1				.3(	.4)
HOMOPTERA							
HOMOPTERA SPP	ADULTS		4			1.0(	1.7)
COLEOPTERA							
COLEOPTERA SPP	ADULTS	1				.3(	.4)
TRICHOPTERA							
LIMNEPHILIDAE SPP	LARVAE			2		.5(	.9)
LEPIDOPTERA							
PYRALIDAE SPP	LARVAE			1		.3(	.4)
DIPTERA							
DIPTERA SPP	PUPAE		233			58.3(	100.9)
DIPTERA SPP	ADULTS		4			1.0(	1.7)
DOLICHOPODIDAE SPP	LARVAE	1				.3(	.4)
CERATOPOGONIDAE SPP	LARVAE	8	5	1		3.5(	3.2)
CHIRONOMIDAE SPP	LARVAE		4	6		2.5(	2.6)
PSYCHODIDAE SPP	LARVAE		2			.5(	.9)
TIPULIDAE SPP	LARVAE		1			.3(	.4)
FISH							
UNIDENTIFIED							
FISH SPP	LARVAE	1	21			5.5(	9.0)
COTTIDAE							
LEPTOCOTTUS ARMATUS	ADULTS			3		.8(	1.3)
	TOTAL	164	2151	[illegible]	1		

Table D-46. Number of animals taken by drift net (non-quantitative) in tidal creeks of the Mature High area. Site 13 (large creek) was sampled by the large drift net on 17 October 1978, 1 November 1978, and 12 April 1979; and site 16 (small creek) was sampled by the small drift net on 12 April 1979. Samples 13-0001 and 13-0002 each sampled about one hour and samples 13-0003 and 16-0001 about two hours during ebb tide. The latter two samples were collected during high winds which stirred bottom materials and likely affected sample composition.

AREA / SAMPLER / SITE / SAMPLE		MAT HI / LD / 13 / 0001	MAT HI / LD / 13 / 0002	MAT HI / LD / 13 / 0003	MAT HI / SD / 16 / 0001	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		7			1.8(3.0)
NEMERTEA						
NEMERTEA SPP	ADULTS			40		10.0(17.3)
NEMATODA						
NEMATODA SPP	ADULTS	4	2	20	1	6.8(7.7)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS		11			2.8(4.8)
SPIRORBIDAE SPP	ADULTS		1			.3(.4)
POLYDORA SPP	ADULTS		1			.3(.4)
STREBLOSPIO SPP	ADULTS		1			.3(.4)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	4	41	40	13	24.5(16.3)
ARANEAE						
ARANEAE SPP	ADULTS		1			.3(.4)
ACARINA						
ACARINA SPP	ADULTS		3		3	1.5(1.5)
CUMACEA						
HEMILEUCON SPP	ADULTS		1	12600	326	3231.8(5410.6)
CUMELLA SPP	ADULTS				8	2.0(3.5)
TANAIDACEA						
PANCOLUS SPP	ADULTS		2		1	.8(.8)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			20	2	5.5(8.4)
AMPHIPODA						
COROPHIUM SPP	ADULTS	1	4			1.3(1.6)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	1		460	18	119.7(196.6)
TALITRIDAE SPP	ADULTS		2			.5(.9)
AMPITHOE SPP	ADULTS	1	1		2	1.0(.7)
DECAPODA						
DECAPODA SPP	ZOEA				1	.3(.4)
COLLEMBOLA						
ENTOMOBRYIDAE SPP	ADULTS		1			.3(.4)
HOMOPTERA						
HOMOPTERA SPP	ADULTS				1	.3(.4)
DIPTERA						
DIPTERA SPP	PUPAE			20		5.0(8.7)
DIPTERA SPP	ADULTS				2	.5(.9)
DOLICHOPODIDAE SPP	LARVAE	1				.3(.4)
CERATOPOGONIDAE SPP	LARVAE	1				.3(.4)
FISH						
UNIDENTIFIED						
FISH SPP	LARVAE				1	.3(.4)
	TOTAL	13	79	13200	374	

Table D-47. Density (number per m^2) of small infauna in a sandflat adjacent to the Low Sand area, 22 July 1978. A single MC sample 10 cm deep was taken at each of 10 sampling points within a 30 m X 60 m grid. The samples were screened on a 0.5 mm sieve.

AREA / SAMPLER / SITE / SAMPLE		L SAND / MC / 02 / 0117	L SAND / MC / 02 / 0501	L SAND / MC / 02 / 0811	L SAND / MC / 02 / 1288	L SAND / MC / 02 / 1323	L SAND / MC / 02 / 2111	L SAND / MC / 02 / 2526	L SAND / MC / 02 / 4122	L SAND / MC / 02 / 5412	L SAND / MC / 02 / 5818	MEAN	(SD)
TAXON	LIFE STAGE												
INVERTEBRATES													
NEMERTEA													
NEMERTEA SPP	ADULTS	123					247	247				61.7	(99.4)
NEMATODA													
NEMATODA SPP	ADULTS		617		617	1357	247	863	863	987		555.1	(452.4)
POLYCHAETA													
CAPITELLIDAE SPP	ADULTS	6661	1604	3454	2960	1480	740	1357		493		1874.9	(1931.4)
NEREIDAE SPP	ADULTS								247			24.7	(74.0)
ETEONE SPP	ADULTS	617	247		247	123	617	247	370			246.7	(220.7)
HAPLOSCOLOPLOS SPP	ADULTS	10361	6908	11472	10485	9005	7401	5921	4194	5921	3454	7512.8	(2603.5)
PSEUDOPOLYDORA SPP	ADULTS					123		123		123		37.0	(56.5)
PYGOSPIO SPP	ADULTS	247		247				123	247	247		111.0	(116.4)
ARABELLIDAE SPP	ADULTS		493		1604							209.7	(487.3)
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS		2837	5057	2714	2637	2590	3454	2220	4317	2220	2824.7	(1280.6)
BIVALVIA													
CRYPTOMYA CALIFORNICA	ADULTS	247				123				247		61.7	(99.4)
OSTRACODA													
OSTRACODA SPP	ADULTS	123										12.3	(37.0)
COPEPODA													
CYCLOPOIDA SPP	ADULTS		493	247	123				123	617		160.4	(214.0)
TANAIDACEA													
PANCOLUS SPP	ADULTS	123										12.3	(37.0)
LEPTOCHELIA SPP	ADULTS							247	617			86.3	(191.5)
AMPHIPODA													
EOHAUSTORIUS SPP	ADULTS	740	247	740	493	493	863	123	617	1604	1480	740.1	(454.9)
PARAPHOXUS SPP	ADULTS	123	123					247	123	247	247	111.0	(102.5)
COLLEMBOLA													
ISOTOMIDAE SPP	ADULTS		123									12.3	(37.0)
HOMOPTERA													
APHIDIDAE SPP	ADULTS		123									12.3	(37.0)
DIPTERA													
CERATOPOGONIDAE SPP	LARVAE	123										12.3	(37.0)
	TOTAL	19468	13815	21217	19243	15541	12705	12952	9621	14803	7481		

Table D-48. Density (number per m^2) of large infauna in a sandflat adjacent to the Low Sand area, 22 July 1978. A single LC sample 30 cm deep was taken at each of 11 sampling points in a 30 m X 60 m grid. The samples were screened on a 2 mm sieve.

AREA		L SAND	L SAND	L SAND	L SAND	L SAND	L SAND	L SAND	L SAND
SAMPLER		LC	LC	LC	LC	LC	LC	LC	LC
SITE		16	16	16	16	16	16	16	16
SAMPLE		0117	0501	0811	1208	1323	2111	2526	4122
TAXON	LIFE STAGE								
INVERTEBRATES									
BIVALVIA CRYPTOMYA CALIFORNICA	ADULTS	55	55	110	164	55	164	55	55
DECAPODA CALLIANASSA SPP	ADULTS		219	219	110	55	164		55
	TOTAL	55	274	329	274	110	328	55	110

SAMPLER		LC	LC	
SITE		16	16	
SAMPLE		5412	5818	
TAXON	LIFE STAGE			MEAN(SD)
INVERTEBRATES				
BIVALVIA CRYPTOMYA CALIFORNICA	ADULTS	55	55	82.2(44.2)
DECAPODA CALLIANASSA SPP	ADULTS	164	164	115.1(79.3)
	TOTAL	219	219	

Table D-49. Density (number per m^2) of small infauna in a mudflat adjacent to the Sedge area, 24 June 1978. A single MC sample 10 cm deep was taken at each of 10 sampling points in a 30 m X 60 m grid. The samples were screened on a 0.5 mm sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		MC	MC	MC	MC	MC	MC	MC	MC	
SITE		02	02	02	02	02	02	02	02	
SAMPLE		0113	0303	0416	1588	2318	2414	5411	5922	
TAXON	LIFE STAGE									MEAN(SD)
INVERTEBRATES										
CNIDARIA										
CNIDARIA SPP	ADULTS			987			123	247		169.6(320.1)
NEMATODA										
NEMATODA SPP	ADULTS		5427							678.4(1794.9)
POLYCHAETA										
CAPITELLIDAE SPP	ADULTS	2220	40212	8388	7401	9375	3947	19489	2220	11656.6(11980.7)
ETEONE SPP	ADULTS	247	247	247		740	370	740	740	416.3(269.4)
PSEUDOPOLYDORA SPP	ADULTS	493		740	493	1234		1480	493	616.8(493.4)
PYGOSPIO SPP	ADULTS		247	4194		6414	433	2226	1974	1942.8(2169.8)
STREBLOSPIO SPP	ADULTS				247		247			61.7(106.8)
HOBSONIA FLORIDA	ADULTS	1727		1440	1234	2714	1234	4194	2220	1850.3(1157.1)
OLIGOCHAETA										
OLIGOCHAETA SPP	ADULTS	39965	54027	31064	49833	36265	15789	57481	47120	41445.6(12809.4)
GASTROPODA										
ALDERIA SPP	ADULTS		2714	247					247	400.9(880.4)
BIVALVIA										
MACOMA BALTHICA	ADULTS	493			740		247	247	987	339.2(347.5)
COPEPODA										
HARPACTACOIDA SPP	ADULTS		1480							185.0(489.5)
CUMACEA										
HEMILEUCON SPP	ADULTS	8388	493	9868	11842	15542		10115	1727	7246.8(5418.9)
CUMELLA SPP	ADULTS					247				30.8(81.6)
AMPHIPODA										
COROPHIUM SPP	ADULTS	6661		5674	6414	5674	4194	5181	247	4255.6(2487.7)
GAMMARUS CONFERVICOLUS	ADULTS			247				247		61.7(106.8)
TALITRIDAE SPP	ADULTS						123			15.4(40.8)
DIPTERA										
DOLICHOPODIDAE SPP	LARVAE		247							30.8(81.6)
	TOTAL	60194	105094	63156	78204	78205	26767	101641	57975	

Table D-50. Density (number per m^2) of large infauna in a mudflat adjacent to the Sedge area, 24 June 1978. A single LC sample 30 cm deep was taken at each of 10 sampling points in a 30 m X 60 m grid (two samples were lost during processing). The samples were screened on a 2 mm sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE
SAMPLER		LC	LC	LC	LC	LC	LC	LC	LC
SITE		03	03	03	03	03	03	03	03
SAMPLE		0113	0303	0505	0616	1508	2310	2414	4423
TAXON	LIFE STAGE								
INVERTEBRATES									
BIVALVIA MACOMA BALTHICA	ADULTS	439	658		932	439	548	384	1535
DECAPODA HEMIGRAPSUS OREGONENSIS	ADULTS		55						
	TOTAL	439	713		932	439	548	384	1535

AREA		SEDGE	SEDGE	SEDGE	
SAMPLER		LC	LC	LC	
SITE		03	03	03	
SAMPLE		4818	5411	5922	
TAXON	LIFE STAGE				MEAN(SD)
INVERTEBRATES					
BIVALVIA MACOMA BALTHICA	ADULTS	603	1042	877	677.8(387.8)
DECAPODA HEMIGRAPSUS OREGONENSIS	ADULTS				5.0(15.8)
	TOTAL	603	1042	877	

APPENDIX E

FISH SAMPLE DATA

Abbreviations for gear used in this appendix are:

LS = large seine
MS = medium seine
OT = otter trawl
SS = small seine

Table E-1.

Area 1 (Low Sand) Sampler MS Site 13 Sample 01 Habitat Low level marsh Date 17 November 1978 Fork Length (mm)	Shiner surfperch	Threespine stickleback
30		2
32		1
33		2
34		1
35		5
36		7
37		3
38		6
39		9
40		5
41		5
42		8
43		9
44		6
45		1
46		1
75	1	

Table E-2.

Area 7 (Netarts Seine) Sampler MS Site 01 Samples 0101-1401 (Combined results of 14 samples) Habitat Low level marsh Date 12 April 1979 Fork Length (mm)	Staghorn sculpin	Threespine stickleback	Surf smelt	Chum salmon
27	2			
29	1			
30	3			
32	7			
33	8			
34	5			
35	2			
36	1			1
37	5			1
38	8			6
39	7			6
40	5			7
41	4		1	4
42	2			2
43	3			
44			2	
45	4	3		
46	2			
48		3	1	
49	2	1		
50		2		
51		1		
52		1		
56	1			
57	1			
59	1			
61	1			
66				1
67	1			

Table E-3.

Area 2 (Low Silt) Sampler MS Site 01 Sample 01 Habitat Low level marsh Date 6 April 1978 Fork Length (mm)	Staghorn sculpin	Threespine stickleback	Surf smelt	Chum salmon
19	1			
23	1			
29	1			
37	1			
39	1			
40				1
47		1	1	
49			4	
50			5	
51			2	
52	1		5	
53		2	11	
54			5	
55	1		4	
56			2	
57		1	4	
58			2	
59	2		3	
60	1			
61	1			
63			2	
64			1	

Table E-4.

Area 3 (Sedge) Sampler MS Site 01 Sample 01 Habitat Low level marsh Date 6 February 1979 Fork Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
22	1	
32	1	
40		1
43	1	

Table E-5.

Area 9 (Siletz Seine)
Sampler LS
Site 01
Samples 01, 02, 04
(Combined results of 3 samples)
Habitat Low level marsh
Date 26 April 1979

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback	Surf Smelt	Starry Flounder	Chum Salmon
18	1				
21	1				
23	3				
25	3				
27	1				
29	1				
31	1				
36	1				
37	1				
38	2				
39	4				
40	1		1		
42					2
43	1		1		1
44	1				4
45					5
46			2		1
47			2		2
48	2		3		2
49			4		1
50			6		1
51		1	1		1
52			2		3
53			6		1
54			5		
55			1		2
56			2		1
57			2		
58			3		
59					1
60	1		1		
171				1	
187				1	
191				1	
193				1	
213				1	
246				1	
258				1	
266				1	

Table E-7.

Area 3 (Sedge)
Sampler SS
Site 18
Sample 01
Habitat Pan
Date 18 September 1978

Fork Length (mm)	Threespine Stickleback
12	1
13	2
14	3
15	4
16	2
17	1
18	3
19	1
20	1
21	1
24	1

Table E-8.

Area 4 (Immature High)
Sampler MS
Site 01
Sample 01
Habitat Pan
Date 7 April 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
48		1
50		1
52		1
55		1
60		1
62		1
76	1	

Table E-6.

Area 2 (Low Silt)
Sampler MS
Site 10
Sample 01
Habitat Pan
Date 18 September 1978

Fork Length (mm)	Threespine Stickleback
20	1
21	1
22	1
25	3
26	4
27	5
28	3
29	4
30	1
32	2
33	1

Table E-9.

Area 5 (Mature High)
Sampler MS
Site 15
Sample 01
Habitat Pan
Date 1 November 1978

Fork Length (mm)	Threespine Stickleback
31	1
33	2
34	1
35	11
36	4
37	16
38	25
39	18
40	23
41	10
42	8
43	4
44	1
45	2
46	1
48	1

Table E-10.

Area 5 (Mature High)
Samper MS
Site 15
Sample 02
Habitat Pan
Date 12 April 1979

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
44	1	
45	1	
48	1	
50	1	
51	1	1
52	3	1
53	3	5
54	1	1
55	4	3
56	2	
57	3	1
58	1	
59	2	
60	1	
62	1	
63	1	
65	1	

Table E-11.

Area 2 (Low Silt)
Sampler MS
Site 02
Sample 01
Habitat Small Tidal Creek
Date 6 April 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
17	1	
21	1	
22	1	
23	3	
24	2	
26	1	
27	3	
28	3	
29	4	
30	1	1
31	2	
33	2	
34	3	
35	1	
36	1	1
37	3	
38	3	
39	2	1
40	2	1
41	3	
42	2	
43	2	
44	3	1
46	1	
47	2	
48	3	
49	2	
50	1	
51	2	
52	3	
53	2	
54	1	
55	2	
56	1	
57	3	
58	2	
66	1	

Table E-12.

Area 2 (Low Silt)
Sampler MS
Site 02
Sample 02
Habitat Small tidal creek
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
20		1
21		2
22		2
23		5
24		1
25		14
26		14
27		15
28		17
29		12
30		8
31		5
32		6
33		3
34	1	5
35		1
36	1	1
38	1	
39	1	
40		1
41		1
44		1
76		1

Table E-13.

Area 3 (Sedge)
Sampler SS
Sites 01, 02
Samples 01, 01
(Combined results of 2 samples)
Habitat Small tidal creek
Date 6 April 1978

Fork Length (mm)	Staghorn Sculpin
23	1
25	1
38	1
46	1
47	1
48	3
50	1
53	1
63	1

Table E-14.

Area 5 (Sedge)
Samplers MS, SS
Site 17
Samples 0211, 0301, 0601, 0801
(Combined results of 4 samples)
Habitat Large tidal creek
Date 18 September 1978

Fork Length (mm)	Topsmelt	Staghorn Sculpin	Prickly Sculpin	Coastal Sculpin	Shiner Surfperch	Threespine Stickleback
22						2
23						3
24						4
25						4
26						7
27						20
28						20
29						21
30						24
31						21
32	1					16
33						5
34			1			9
35			2			8
36						6
37				1		5
38						3
40						1
41			1			
44	1					
61						1
72					1	
82		1				
84		1				
89		1				
90		1				
93		1				
115		1				
124		1				

Table E-15.

Area 5 (Mature High)
Sampler MS
Site 14
Sample 0101, 0201, 0401
(Combined results of 3 samples)
Habitat Large tidal creek
Date 1 November 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
22		1
23		1
27		1
28		3
29		5
30		1
31		4
32		4
33		9
34		6
35		15
36		12
37		8
38		20
39		13
40		23
41		15
42	2	23
43		13
44		12
45		6
46		4
47		3
48		2
49		2
51		1
54		1
58		1

Table E-16.

Area 5 (Mature High)
Sampler MS
Site 14
Sample 0102, 0301
(Combined results of 2 samples)
Habitat Large tidal creek
Date 12 April 1979

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback	Surf Smelt	Chum Salmon
35	2			
36	2			
37	1			
39	1	1		1
40	5			
41	4			
42	3		1	
43	6			
44	2			
45	4			
46	4			
47	5	1		
48	7	1		
49	3			
50	2			
51	3			
52	7	2		
53	3			
54	2			
55	3			
56	2	2		
57	2			
59	3			
61	4	-		
63	1			
64	1			
69	1			
73	2			
82	1			

Table E-17.

Area 3 (Sedge)
Sampler LS
Site 11
Sample 01
Habitat Slough
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Prickly Sculpin	Shiner Surfperch	White Surfperch	Northern Anchovie	Threespine Stickleback	Surf Smelt	Starry Flounder	Chinook Salmon
25						2			
26						1			
27						3			
28						2			
29						8			
30						12			
31						15			
32						9			
33						12			
34						12	1		
35						14			
36						10			
37						8			
38						9			
39						1			
40						9			
41						3			
43						1			
44						2			
45						1			
46						1			
47						1			
50						2			
51						1			
52						1			
55						1			
58			1						
60			1						
61			6						
62			6						
63			4						
64			6						
65			7						
66			7						
67			5						
68			4						
69			4						
70			5						
71			4						
72			2						
73			1		1				
74			3		1				
75			1						
76				1	1				
84			2						
94			1						
97								1	1
98			1						
99			1						
101									2
102									1
104									1
105			2						1
108			1						
110					1				
113			3						
114			2						
122			1						
128								1	
130			1						
131			1						
137								1	
138	1								
142		1							
160	1								
172							1		
196								1	

Table E-18.

Area 3 (Sedge)
Sampler LS
Site 10
Sample 01
Habitat Slough
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Shiner Surfperch	Pacific Tomcod	Threespine Stickleback	Surf Smelt	Saddleback Gunnel	Starry Flounder	Chinook Salmon
32				1				
35				1				
50		1						
51		1						
52		1						
53		2						
55		1						
56		4						
57		4						
58		9						
59		1						
60		1						
61		4						
62		7						
63		7						
64		6						
65		13						
66		3						
67		11						
68		14						
69		16						
70		22						
71		12						
72		6						
73		13						
74		11						
75		17						
76		8						
77		7						
78		6						
79		7	1					
80		5				1		
82		1						
83		3						
84		1						
85		2						
86		1						
87		2						
88		2						1
92		3						
93		1						
94		2						
95		2						
96		3						1
97		4						
98		3						
99		2						1
100		7						2
101	1	2						
102		4						
103		4						
105		2						1
106		3						
107		4				1		
108		5						
109		3						
110		9						
111		3						
112		2						
113		6						
114		6						
115	1	5						
116		1						
117		1						
118		2						
119		1						
120		2						
121		1						
122		2						
124		2						
125		2					1	
127		1						
128		2						
129		2						
133		1						
137		1						
147	1							
154		1						
164					1			
173	1							

Table E-19.

Area 3 (Sedge)
Sampler LS
Site 10
Sample 02
Habitat Slough
Date 26 April 1979

Fork Length (mm)	Staghorn Sculpin	Shiner Surfperch	Threespine Stickleback	Surf Smelt	Starry Flounder	Chum Salmon	Chinook Salmon	Steelhead Trout
36	1							
41	1							
43	2							
45	1							
47	1							
48						1		
49				1				
50			1			1		
54						2		
55				3				
56				2				
58				1				
60			1	1		1		
62				2			1	
63				1				
64				2				
65				2				
66				2				
67				3				
68				3				
69				1				
70				1			1	
71				1				
73				1				
74		1						
83		1						
89		1						
109		1						
112		1						
113		1						
115		1						
116		1						
118		1						
125		3						
128		1						
135		1						
136		1						
138		1						
180								1
228					1			

Table E-21.

Area 1 (Low Sand)
Sampler MS
Site 01
Sample 01
Habitat Tidal flat (sandy)
Date 7 February 1978

Fork Length (mm)	Staghorn Sculpin	Surf Smelt
36	1	2
41		1
42		1

Table E-22.

Area 1 (Low Sand)
Sampler MS
Site 01
Sample 02
Habitat Tidal flat (sandy)
Date 3 June 1978

Fork Length (mm)	Staghorn Sculpin	English Sole
33		1
35		1
45	1	
46		1
48		1
50		1
51	1	
53	1	
55	1	1
60	1	
62	1	

Table E-20.

Area 3 (Sedge)
Sampler MS
Site 23
Sample 01
Habitat Slough (shallow region)
Date 26 April 1979

Fork Length (mm)	Staghorn Sculpin
28	1
35	1
36	1
39	1
40	2
41	2
42	2
43	3
44	3
45	3
46	3
47	2
48	1
49	1
50	1
51	2
52	2
53	4
54	1
56	1
60	1

Table E-23.

Area 2 (Low Silt)
Sampler MS
Site 11
Sample 01
Habitat Tidal flat (muddy)
Date 18 September 1978

Fork Length (mm)	Shiner Surfperch	Threespine Stickleback
11	1	
21	3	
22	1	
23	1	
24	4	
25	6	
26	10	
27	4	
28	8	
29	8	
30	9	
31	4	
32	1	
33	2	
34	3	
35	1	
37	1	
39	1	
41	1	
52	1	
60		1
67		1
68		1
73		1

Table E-24.

Area 9 (Siletz Trawl)
Sampler OT
Site 11
Sample 01
Habitat Tidal flat (muddy)
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Shiner Surfperch	Saddleback Gunnel	Starry Flounder	English Sole	Sand Sole
65		1				
70	1					
75				1		
77			1			
79			1	1		
80				2		
83			2			
84			1	1		
85				1		
87			1			
88			1			
93		1				
95		1		1		
97				1		
99				2		
100						1
102	1			1		
103				1		
106		1				
113	1					
115		2	1			
116	1					
117	2					
119		1				
120	1					
124					1	
128			1			
130				1		
133	1					
135				2		
141				1		
144				2		
150				1		
150				1		
165				1		
167				1		
182				1		
185				1		
193	1					
201				1		
218				1		
243				1		

Table E-25.

Area 6 (Netarts Trawl)
Sampler OT
Sites 01 08
Sample 01 (each site)
(Combined results of eight samples.)
Habitat Bay channel
Date 2 June 1978

Fork Length (mm)	Pacific Sandlance	Speckled Sanddab	Staghorn Sculpin	Buffalo Sculpin	Cabezon	Tubesnout	Threespine Stickleback	Lingcod	Kelp Greenling	Surf Smelt	Saddleback Gunnel	English Sole	Sand Sole	Snake Prickleback	Bay Pipefish	Rockfish spp.
20												1				
21												1				
23												4				
24												4				
25												7				
26												7				
27												23				
28		1										25				
29												30				
30												23				
31												16				
32												18				
33												15				
34				1								7				
35												13				
36												6				
37			1									5				
38		1										3				
39				1								9				
40												9				
41		3										1				
42		1										9				1
43		4										6				
44		3										5				
45		3										4				
46		3			1							4				
47		5										10				
48		4										4				
49		3			1							3				
50			1									4				
51												7				
52		1			2							7				
53		1	1									2				
54		1										2				
55			1				2					3				
56		2	1									3				
57												5				
58			2									3				
59		1	1				1		1			1				
60			4						1			3				
61	2	4	1									2				
62	1		1						1			4				
63		1	1						6			2				
64		2	2													
65		3							2			2				
66		1	1									1				
67			1						1							
68		1	1						2							
70		2	3						2							
71		1	1	1							1					
72								1	1							
73			2						3							
74	1								2			1		1		
75			3			1				1		2				

Area 6 (Netarts Trawl)
Sampler 01
Sites 01 08
Sample 01 (each site)
(Combined results of eight samples.)
Habitat Bay channel
Date 2 June 1978

Fork Length (mm)	Pacific Sandlance	Speckled Sanddab	Staghorn Sculpin	Buffalo Sculpin	Cabezon	Tubesnout	Threespine Stickleback	Lingcod	Kelp Greenling	Surf Smelt	Saddleback Gunnel	English Sole	Sand Sole	Snake Prickleback	Bay Pipefish	Rockfish spp.
76		2	3													
77			3													
78		1	1								2					
79		3	2													
80		1	1	1								1				
81	1		2						1		1					
82	1	1	1					2								
83	1		1													
84		2	3					1			1	1				
85	1		3			1		1				2				
86			2									1				
87								1								
88								1								
89			1					2				1				
90			2													
91			1					3								
92								2			1					
93								1								
94								1								
95								2				1				
96			1					4				1				
97			1					2								
98								1								
99								1				1				
100			1										1			
101											2					
102								2								
103													1			
105			1					1								
106													1			
108								1								
110												1				
111								1								
115		1						1								
116								1								
120								1								
127													1			
129											1					
139						1										
156															1	
166														1		
214				1												
217															1	
232															1	
245															1	
248															1	

Table E-26.

Area 9 Silet: Trawl
Sampler OT
Sites 12, 15, 16
Sample 01 (each site)
(Combined results of 3 samples.
Habitat Bay channel
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Buffalo Sculpin	Cabezon	Shiner Surfperch	Threespine Stickleback	Saddleback Gunnel	Starry Flounder	English Sole	Sand Sole	Chinook Salmon
32					1					
51								1		
53		1								
62						1				
66			1							
68				1						
70							1			
79							1			
82	1									
90										1
91								1		
95								1		
97									1	
98	1									
99								1		
103								1		
107	1									
111	1									
118						1				
120	1									
123							1			
124	1						1			
126							2			
134							1			
135							1			
138							1			
144							1			
146							1			
159							1			
171	1									
181							1			
193							1			
324							1			
384							1			
425							1			

APPENDIX F

FISH FOOD HABITS DATA

Stomach contents of fish captured in marsh and bay channel habitats. Each food habits table is referenced to the appropriate table in Appendix E which provides species and length-frequency data for the sample. Mean prey volumes are shown for all fish examined in a sample (excluding fish with empty stomachs). Means shown as ".0" represent values <.05%.

Fish species codes are interpreted in the following table:

	Family	Scientific Name	Common Name
0301	Ammodytidae	*Ammodytes hexapterus*	Pacific Sandlance
0401	Atherinidae	*Atherinops affinis*	Topsmelt
0901	Bothidae	*Citharichthys stigmaeus*	Speckled Sanddab
1601	Cottidae	*Leptocottus armatus*	Staghorn Sculpin
1602	Cottidae	*Enophrys bison*	Buffalo Sculpin
1603	Cottidae	*Scorpaenichthys marmoratus*	Cabezon
1604	Cottidae	*Cottus asper*	Prickly Sculpin
1605	Cottidae	*Cottus aleuticus*	Coastal Sculpin
2201	Embiotocidae	*Cymatogaster aggregata*	Shiner Surfperch
2202	Embiotocidae	*Phanerodon furcatus*	White Surfperch
2301	Engraulidadae	*Engraulis mordax*	Northern Anchovy
2401	Gadidae	*Microgadus proximus*	Pacific Tomcod
2501	Gasterosteidae	*Aulorhynchus flavidus*	Tubesnout
2502	Gasterosteidae	*Gasterosteus aculeatus*	Threespine Stickleback
2901	Hexagrammidae	*Ophiodon elongatus*	Lingcod
2902	Hexagrammidae	*Hexagrammos decagrammus*	Kelp Greenling
3401	Osmeridae	*Hypomesus pretiosus*	Surf Smelt
3901	Pholidae	*Pholis ornata*	Saddleback Gunnel
4001	Pleuronectidae	*Platichthys stellatus*	Starry Flounder
4002	Pleuronectidae	*Parophrys vetulus*	English Sole
4003	Pleuronectidae	*Psettichthys melanostictus*	Sand Sole
4401	Salmonidae	*Oncorhynchus keta*	Chum Salmon
4402	Salmonidae	*Oncorhynchus tshawytscha*	Chinook Salmon
4403	Salmonidae	*Salmo gairdnerii*	Steelhead Trout
4801	Scorpaenidae	*Sebastes spp*	Rockfish spp
5301	Stichaeidae	*Lumpenus sagitta*	Snake Prickleback
5401	Syngnathidae	*Syngnathus leptorhynchus*	Bay Pipefish

Abbreviations for gear used in this appendix are:

LS = large seine
MS = medium seine
OT = otter trawl
SS = small trawl

Table F-1. (Reference Table E-1)

AREA: L SAND
SAMPLER: HS
SITE: 13
SAMPLE: 1

SPECIES:			2502		2502		2502		2502		2502		2507
SPECIMEN			1		2		3		4		5		5
FK LNG MM			43		36		42		43		38		42
STOM FULL %			60		50		75		50		30		60
BOLUS VOL MM**3			13.8		5.4		42.9		20.8		6.9		32.3
DIG STATE			6		5		6		3		4		6
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	61.8	ND	53.9	ND	39.6	ND	86.1	ND	50.8	ND	60.2
INVERTEBRATES													
NEMATODA													
PARASITIC SPP	ADULTS									1	.4		
POLYCHAETA													
POLYCHAETA SPP	ADULTS												
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS												
CRUSTACEA													
CRUSTACEA SPP	ADULTS					1	.8						
OSTRACODA													
OSTRACODA SPP	ADULTS	9	.7	4	.8	10	.6			1	.4		
COPEPODA													
HARPACTICOIDA SPP	ADULTS	176	24.8	79	13.5	267	19.8	16	1.4	53	11.4	21	1.6
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE					1	.2	1	.5	2	1.1		
CUMACEA													
CUMELLA SPP	ADULTS												
TANAIDACEA													
TANAIDACEA SPP	ADULTS	1	1.8	25	28.2	50	29.1			1	1.8	11	4.8
AMPHIPODA													
AMPHIPODA SPP	JUVENILES												
AMPHIPODA SPP	ADULTS					1	4.1						
COROPHIUM SPP	ADULTS	6	5.8	1	6.7	3	1.2	8	8.6			39	31.2
AMPITHOE SPP	ADULTS					1	4.6						
DIPTERA													
DIPTERA SPP	LARVAE												
EPHYDRIDAE SPP	LARVAE	1	2.8										
MUSCIDAE SPP	LARVAE			2	2.5								
DOLICHOPODIDAE SPP	LARVAE	1	.5										
CERATOPOGONIDAE SPP	LARVAE	16	3.4	3	2.4	1	.3	8	3.4	11	5.7	3	.4
CHIRONOMIDAE SPP	LARVAE											1	1.4

Table F-1. (Concluded)

AREA: L SAND
SAMPLER: HS
SITE: 13
SAMPLE: 1

SPECIES:			2502		2502		2502		2502		2201	
SPECIMEN			7		8		9		10		11	
FK LNG MM			39		42		36		44		75	
STOM FULL %			50		88		60		75		15	
BOLUS VOL MM**3			13.8		59.3		13.9		64.0		15.6	
DIG STATE			5		7		7		9		5	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	68.5	NO	28.4	NO	57.8	NO	14.0	NO	64.8	55.2
INVERTEBRATES												
NEMATODA												
PARASITIC SPP	ADULTS											.0
POLYCHAETA												
POLYCHAETA SPP	ADULTS			423	68.9							6.3
OLIGOCHAETA												
OLIGOCHAETA SPP	ADULTS							334	85.8			7.6
ACARINA												
ACARINA SPP	ADULTS					1	.2			1	.4	.1
CRUSTACEA												
CRUSTACEA SPP	ADULTS											.1
OSTRACODA												
OSTRACODA SPP	ADULTS			6	.2	2	.3			27	4.7	.7
COPEPODA												
HARPACTICOIDA SPP	ADULTS	97	18.0	38	1.1	68	15.9			29	2.7	9.5
CIRRIPEDIA												
CIRRIPEDIA SPP	LARVAE			3	.3	1	.2					.2
CUMACEA												
CUMELLA SPP	ADULTS	18	3.8			2	1.8					.9
TANAIDACEA												
TANAIDACEA SPP	ADULTS	18	7.8	2	.2	8	5.0			51	21.4	4.2
AMPHIPODA												
AMPHIPODA SPP	JUVENILES					2	.6			2	1.4	.2
AMPHIPODA SPP	ADULTS											.4
COROPHIUM SPP	ADULTS	5	2.9	6	.7	21	16.0					6.7
AMPITHOE SPP	ADULTS											.4
DIPTERA												
DIPTERA SPP	LARVAE			3	.2							.0
EPHYDRIDAE SPP	LARVAE											.2
MUSCIDAE SPP	LARVAE											.2
DOLICHOPODIDAE SPP	LARVAE											.0
CERATOPOGONIDAE SPP	LARVAE	1	1.8			7	3.0	1	.2	14	6.8	2.3
CHIRONOMIDAE SPP	LARVAE									1	1.3	.4

Table F-2. (Reference Table E-2)

AREA: N SKIN
SAMPLER: MS
SITE: 1
SAMPLE: 0181-1401

SPECIES:			4401		1601		1601		1601		1601		1601
SPECIMEN			1		2		3		4		5		6
FK LNG MM			43		57		28		40		46		38
STOM FULL %			70		100		90		65		80		75
BOLUS VOL MM**3			13.0		512.0		5.0		4.9		45.0		3.0
DIG STATE			7		6		5		4		4		3
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	35.0	NO	8.5	NO	65.6	NO	65.6	NO	54.9	NO	92.8
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS							1	4.1				
NEMATODA													
PARASITIC SPP	ADULTS												
POLYCHAETA													
POLYCHAETA SPP	ADULTS			NO	14.8								
ETEONE SPP	ADULTS												
NEANTHES LIMNICOLA	ADULTS			1	54.2								
CRUSTACEA													
CRUSTACEA SPP	JUVENILES												
COPEPODA													
CALANOIDA SPP	ADULTS	1	.5										
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS					19	28.0	2	1.6				
CUMACEA													
CUMACEA SPP	ADULTS												
HEMILEUCON SPP	ADULTS	10	60.0							1	2.0		
TANAIDACEA													
TANAIDACEA SPP	ADULTS											1	2.6
ISOPODA													
ISOPODA SPP	JUVENILES									1	.2		
AMPHIPODA													
AMPHIPODA SPP	ADULTS					1	18.9	1	16.4				
AMPHIPODA SPP	JUVENILES												
COROPHIUM SPP	ADULTS	1	4.5					3	12.3	NO	26.6	1	1.5
ANISOGAMMARUS CONFERVICOLU	ADULTS			1	8.9					1	15.7		
AMPITHOE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	PUPAE												
CERATOPOGONIDAE SPP	LARVAE					1	2.7						
CHIRONOMIDAE SPP	LARVAE			1	.1					2	.6	2	3.1
FISH													
UNIDENTIFIED	UNSPECIFIED												
COTTIDAE													
STAGHORN SCULPIN	UNSPECIFIED			1	13.5								

Table F-2. (Continued)

AREA: N SEIN
SAMPLER: MS
SITE: 1
SAMPLE: 0181-1401

SPECIES:			1601		1601		4401		4401		4401		4401
SPECIMEN			7		8		9		10		11		12
FK LNG MM			30		32		38		42		37		38
STOM FULL %			40		60		20		60		40		60
BOLUS VOL MM**3			2.2		4.1		.8		9.8		4.8		5.9
DIG STATE			4		6		1		3		4		4
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	75.9	NO	48.8	NO	100.0	NO	36.4	NO	16.9	NO	42.3
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS												
NEMATODA													
PARASITIC SPP	ADULTS												
POLYCHAETA													
POLYCHAETA SPP	ADULTS												
ETEONE SPP	ADULTS												
NEANTHES LIMNICOLA	ADULTS												
CRUSTACEA													
CRUSTACEA SPP	JUVENILES							1	.6				
COPEPODA													
CALANOIDA SPP	ADULTS							1	1.2				
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS	9	19.2	22	49.8								
CUMACEA													
CUMACEA SPP	ADULTS	1	2.6					NO	3.9				
HEMILEUCON SPP	ADULTS							28	57.6	6	56.4	13	50.9
TANAIDACEA													
TANAIDACEA SPP	ADULTS			1	7.1					2	16.9		
ISOPODA													
ISOPODA SPP	JUVENILES												
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
AMPHIPODA SPP	JUVENILES							1	.3				
COROPHIUM SPP	ADULTS												
ANISOGAMMARUS CONFERVICOLU	ADULTS												
AMPITHOE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	PUPAE											1	6.8
CERATOPOGONIDAE SPP	LARVAE	1	1.3	2	3.1					1	7.4		
CHIRONOMIDAE SPP	LARVAE												
FISH													
UNIDENTIFIED	UNSPECIFIED												
COTTIDAE													
STAGHORN SCULPIN	UNSPECIFIED												

Table F-2. (Continued)

AREA: N SEIN
SAMPLER: NS
SITE: 1
SAMPLE: 0161-1601

SPECIES:		2582		2582		2582		4401		3401		2502
SPECIMEN		13		14		15		16		17		18
FK LNG MM		52		53		69		39		43		43
STOM FULL %		40		56		68		40		10		35
BOLUS VOL MM**3		12.2		5.8		9.3		1.8		.1		5.3
DIG STATE		2		8		7		3		1		1
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	95.0	NO	12.8	NO	38.2	NO	75.0	NO	100.0	NO	51.0
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS												
NEMATODA													
PARASITIC SPP	ADULTS											1	1.0
POLYCHAETA													
POLYCHAETA SPP	ADULTS												
ETEONE SPP	ADULTS												
NEANTHES LIMNICOLA	ADULTS												
CRUSTACEA													
CRUSTACEA SPP	JUVENILES												
COPEPODA													
CALANOIDA SPP	ADULTS	2	5.0	8	8.9	1	1.5						
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS			2	1.3	1	.6						
CUMACEA													
CUMACEA SPP	ADULTS												
HEMILEUCON SPP	ADULTS			5	38.5	13	26.3	1	25.0			2	7.2
TANAIDACEA													
TANAIDACEA SPP	ADULTS												
ISOPODA													
ISOPODA SPP	JUVENILES												
AMPHIPODA													
AMPHIPODA SPP	ADULTS			3	38.5								
AMPHIPODA SPP	JUVENILES												
COROPHIUM SPP	ADULTS					1	27.2					2	40.8
ANISOGAMMARUS CONFERVICOLU	ADULTS					1	6.2						
AMPITHOE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	PUPAE												
CERATOPOGONIDAE SPP	LARVAE												
CHIRONOMIDAE SPP	LARVAE												
FISH													
UNIDENTIFIED	UNSPECIFIED												
COTTIDAE													
STAGHORN SCULPIN	UNSPECIFIED												

Table F-2. (Continued)

ARTAK N SEIN
SAMPLER: HS
SITE: 1
SAMPLE: 0181 1401

SPECIES:			6401		1601		1601		4401		3401		4401	
SPECIMEN			19		20		21		22		23		24	
FK LNG MM			42		61		44		40		45		39	
STOM FULL %			65		98		90		45		15		80	
BOLUS VOL MM**3			11.8		196.8		91.1		6.0		4.1		27.0	
DIG STATE			1		2		5		6		5		6	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	22.8	ND	61.6	ND	42.9	ND	100.0	ND	51.7	ND	63.7	[illegible]5.1
INVERTEBRATES														
PROTOZOA														
FORAMINIFERA SPP	ADULTS													.2
NEMATODA														
PARASITIC SPP	ADULTS													.0
POLYCHAETA														
POLYCHAETA SPP	ADULTS													.6
ETEONE SPP	ADULTS					2	17.2							.7
NEANTHES LIMNICOLA	ADULTS													2.2
CRUSTACEA														
CRUSTACEA SPP	JUVENILES													.0
COPEPODA														
CALANOIDA SPP	ADULTS													.7
CYCLOPOIDA SPP	ADULTS											1	1.9	.1
HARPACTICOIDA SPP	ADULTS			1	.1	1	.2			1	3.9			3.9
CUMACEA														
CUMACEA SPP	ADULTS													.3
HEMILEUCON SPP	ADULTS	26	58.6							3	44.8	35	45.8	19.4
TANAIDACEA														
TANAIDACEA SPP	ADULTS			1	.3	9	8.6							1.4
ISOPODA														
ISOPODA SPP	JUVENILES													.6
AMPHIPODA														
AMPHIPODA SPP	ADULTS			ND	5.2	2	5.7							3.1
AMPHIPODA SPP	JUVENILES													.3
COROPHIUM SPP	ADULTS	2	11.8			3	5.3							5.2
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	8.4									2	6.6	1.8
AMPITHOE SPP	ADULTS					1	28.1							.8
DIPTERA														
DIPTERA SPP	PUPAE											1	1.1	.3
CERATOPOGONIDAE SPP	LARVAE											1	.9	.6
CHIRONOMIDAE SPP	LARVAE													.2
FISH														
UNIDENTIFIED	UNSPECIFIED			1	32.6									1.3
COTTIDAE														
STAGHORN SCULPIN	UNSPECIFIED													.5

Table F-2. (Concluded)

AREA: N SLTN
SAMPLER: HS
SITE: 1
SAMP E: 0101-1401

SPECIES:			4401		4401	
SPECIMEN			1		2	
FK LNG MM			41		43	
STOM FULL %			55		63	
BOLUS VOL MM**3			4.2		3.6	
DIG STATE			6		7	
PREY		NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	63.6	ND	26.0	44.7
INVERTEBRATES						
COPEPODA						
HARPACTICOIDA SPP	ADULTS	1	.1			.1
CUMACEA						
HEMILEUCON SPP	ADULTS	14	29.0	17	71.0	50.0
AMPHIPODA						
COROPHIUM SPP	ADULTS	1	2.0			1.0
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	5.0			2.[illegible]
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE	2	.5	2	3.0	1.8

Table F-3. (Reference Table E-5)

AREA: S SEIN
SAMPLER: LS
SITE: 1
SAMPLE: 1

		1		2		3		4		5		6	
SPECIES:		1601		2502		1601		3401		4401		4401	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		48		51		60		43		52		52	
STOM FULL %		95		60		80		8		65		85	
BOLUS VOL MM**3		12.5		21.6		9.6		0		18.0		12.5	
DIG STATE		6		7		7		8		2		2	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	18.0	NO	11.0	NO	15.0			NO	63.0	NO	84.7
INVERTEBRATES													
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS												
COPEPODA													
HARPACTICOIDA SPP	ADULTS												
CUMACEA													
HEMILEUCON SPP	ADULTS	4	3.0	6	5.0								
AMPHIPODA													
COROPHIUM SPP	ADULTS	10	80.0										
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	1.0	4	14.0	2	85.0						
ORTHOPTERA													
ORTHOPTERA SPP	ADULTS									2	1.0		
DIPTERA													
DIPTERA SPP	PUPAE									20	7.0	12	5.0
DIPTERA SPP	ADULTS									11	8.0		
CERATOPOGONIDAE SPP	PUPAE												
CERATOPOGONIDAE SPP	LARVAE											6	.5
PSYCHODIDAE SPP	ADULTS											13	10.0
PSYCHODIDAE SPP	PUPAE												
HYMENOPTERA													
FORMICIDAE SPP	ADULTS									1	1.0	1	.6
FISH													
UNIDENTIFIED FIS	LARVAE			7	78.0								

		7		8		9		10		
SPECIES:		1601		1601		4401		1601		
SPECIMEN		7		8		9		10		
FK LNG MM		27		31		49		21		
STOM FULL %		80		78		85		65		
BOLUS VOL MM**3		1.7		.9		4.8		.6		
DIG STATE		1		5		3		0		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	58.4	NO	40.0	NO	76.0	NO	100.0	54.6
INVERTEBRATES										
POLYCHAETA										
AMPHARETIDAE SPP	ADULTS	1	.6							.1
OSTRACODA										
OSTRACODA SPP	ADULTS			3	18.0					2.0
COPEPODA										
HARPACTICOIDA SPP	ADULTS			1	.2					.0
CUMACEA										
HEMILEUCON SPP	ADULTS			1	1.0	2	.5			1.1
AMPHIPODA										
COROPHIUM SPP	ADULTS	2	41.0	2	32.0	2	8.0			17.0
ANISOGAMMARUS CONFERVICOLU	ADULTS									11.1
ORTHOPTERA										
ORTHOPTERA SPP	ADULTS									.1
DIPTERA										
DIPTERA SPP	PUPAE					6	8.3			2.2
DIPTERA SPP	ADULTS									.9
CERATOPOGONIDAE SPP	PUPAE	1	3.0							.3
CERATOPOGONIDAE SPP	LARVAE					2	.5			.1
PSYCHODIDAE SPP	ADULTS					4	7.0			1.9
PSYCHODIDAE SPP	PUPAE	1	.1							.0
HYMENOPTERA										
FORMICIDAE SPP	ADULTS									.2
FISH										
UNIDENTIFIED	LARVAE									7.0

Table F-4. (Reference Table E-5)

AREA: S SEIN
SAMPLER: LS
SITE: 1
SAMPLE: 2

SPECIES:			4301		4001		4301		4801		4301	
SPECIMEN			1		2		3		4		3	
FK LNG MM			189		215		25?		169		1?3	
STOM FULL %			40		78		55		33		75	
CONTS VOL MM**3			42.0		66.0		378.0		19.0		116.0	
DIG STATE			0		3		0		6		1	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	26.0	NO	3.0	NO	2.0	NO	41.7	NO	99.8	34.5
INVERTEBRATES												
POLYCHAETA												
POLYCHAETA SPP	ADULTS			1	1.0							.2
ETEONE SPP	ADULTS							1	1.0			.2
GLYCERA SPP	ADULTS			1	3.0					1	.2	.6
CUMACEA												
HEMILEUCON SPP	ADULTS							1	.3			.1
AMPHIPODA												
COROPHIUM SPP	ADULTS	18	69.0					2	2.0			14.2
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	5.0					2	16.0			4.2
DECAPODA												
DECAPODA SPP	LARVAE			NO	93.0							18.6
CALLIANASSA SPP	ADULTS					1	98.0					19.6
DIPTERA												
TABANIDAE SPP	PUPAE							1	39.0			7.8

Table F-5. (Reference Table E-5)

AREA: S SEIN
SAMPLER: LS
SITE: 1
SAMPLE: 6

SPECIES:			4481		4481		4481		4481		4481		4481
SPECIMEN			1		2		3		4		5		6
FK LNG MM			43		42		47		51		52		56
STOM FULL %			80		85		80		95		92		97
BOLUS VOL MM**3			12.5		4.0		18.2		12.5		12.3		31.3
DIG STATE			3		4		3		2		5		8
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	80.3	NO	61.0	NO	43.0	NO	69.0	NO	44.0	NO	7.1
INVERTEBRATES													
ARANEAE													
ARANEAE SPP	ADULTS	1	.8							1	1.0		
COPEPODA													
COPEPODA SPP	ADULTS	1	.2										
CALANOIDA SPP	ADULTS											1	.1
HARPACTICOIDA SPP	ADULTS												
MYSIDACEA													
MYSIDACEA SPP	ADULTS											2	2.5
AMPHIPODA													
COROPHIUM SPP	ADULTS											1	.2
DECAPODA													
DECAPODA SPP	LARVAE											1	.2
CARIDEA SPP	ADULTS												
COLLEMBOLA													
COLLEMBOLA SPP	ADULTS					1	1.0					1	1.0
HEMIPTERA													
HEMIPTERA SPP	ADULTS							NO	2.0			1	.1
COLEOPTERA													
COLEOPTERA SPP	LARVAE	1	.5										
COLEOPTERA SPP	ADULTS												
DIPTERA													
DIPTERA SPP	ADULTS											6	1.0
DIPTERA SPP	PUPAE	13	6.8	22	31.0	14	6.0	41	26.0	88	51.0	2	.2
DOLICHOPODIDAE SPP	LARVAE									1	1.0		
CERATOPOGONIDAE SPP	LARVAE	4	1.0	20	4.0								
CHIRONOMIDAE SPP	LARVAE	1	.6									1	.1
PSYCHODIDAE SPP	PUPAE					49	47.0						
PSYCHODIDAE SPP	LARVAE	6	1.6					3	2.0	29	2.0		
PSYCHODIDAE SPP	ADULTS			2	1.0	7	2.0			1	1.0	33	6.0
HYMENOPTERA													
HYMENOPTERA SPP	ADULTS					1	1.0					3	1.0
FORMICIDAE SPP	ADULTS	1	1.0					1	1.0				
FISH													
UNIDENTIFIED	LARVAE											34	80.5

Table F-5. (Concluded)

AREA: 5 SEIN
SAMPLER: LS
SITE: 1
SAMPLE: 4

SPECIES:			4401		4401		4401		4401	
SPECIMEN			7		8		9		10	
FK LNG MM			62		59		55		45	
STOM FULL %			92		97		96		88	
BOLUS VOL MM**3			12.5		17.6		18.8		6.4	
DIG STATE			8		8		7		5	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	19.7	NO	8.8	NO	9.2	NO	78.5	42.6
INVERTEBRATES										
ARANEAE										
ARANEAE SPP	ADULTS									.2
COPEPODA										
COPEPODA SPP	ADULTS									.0
CALANOIDA SPP	ADULTS	1	.1							.0
HARPACTICOIDA SPP	ADULTS	1	.1							.0
MYSIDACEA										
MYSIDACEA SPP	ADULTS			2	1.0					.4
AMPHIPODA										
COROPHIUM SPP	ADULTS	1	.1			1	.1	3	4.8	.4
DECAPODA										
DECAPODA SPP	LARVAE									.0
CARIDEA SPP	ADULTS					1	.5			.1
COLLEMBOLA										
COLLEMBOLA SPP	ADULTS									.2
HEMIPTERA										
HEMIPTERA SPP	ADULTS									.2
COLEOPTERA										
COLEOPTERA SPP	LARVAE									.1
COLEOPTERA SPP	ADULTS							1	.5	.1
DIPTERA										
DIPTERA SPP	ADULTS	9	4.0					10	3.0	.6
DIPTERA SPP	PUPAE			4	1.0			21	13.0	13.4
DOLICHOPODIDAE SPP	LARVAE									.1
CERATOPOGONIDAE SPP	LARVAE									.9
CHIRONOMIDAE SPP	LARVAE	9	2.0			2	.2	9	1.0	.4
PSYCHODIDAE SPP	PUPAE	69	76.0							12.1
PSYCHODIDAE SPP	LARVAE									.6
PSYCHODIDAE SPP	ADULTS			6	2.0	4	3.0			1.5
HYMENOPTERA										
HYMENOPTERA SPP	ADULTS									.2
FORMICIDAE SPP	ADULTS							2	2.0	.4
FISH										
UNIDENTIFIED	LARVAE			36	88.0	27	88.0			25.6

Table F-6. (Reference Table E-6)

AREA: L SILT
SAMPLER: MS
SITE: 18
SAMPLE: 1

SPECIES:		2502		2502		2502		2502		2502		2502	
SPECIMEN			1		2		3		4		5		6
FK LNG MM			21		22		25		29		32		28
STOM FULL %			80		0		50		60		66		75
BOLUS VOL MM**3			5.4		0		2.8		22.8		27.3		15.6
DIG STATE			3		0		7		4		4		4
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	68.2			NO	58.6	NO	51.3	NO	38.1	NO	55.8
INVERTEBRATES													
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS											1	4.5
GASTROPODA													
ALDERIA SPP	ADULTS							1	11.6	2	7.8	1	3.4
ACARINA													
ACARINA SPP	ADULTS					1	.4						
OSTRACODA													
OSTRACODA SPP	ADULTS					1	.8					6	2.2
COPEPODA													
HARPACTICOIDA SPP	ADULTS	41	20.4			36	8.4	7	1.3	29	3.7	57	13.4
CUMACEA													
HEMILEUCON SPP	ADULTS									1	3.8		
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS					2	17.8						
AMPHIPODA													
COROPHIUM SPP	ADULTS									2	15.6		
DIPTERA													
DIPTERA SPP	PUPAE							1	1.9	1	1.9		
MUSCIDAE SPP	LARVAE											1	2.2
DOLICHOPODIDAE SPP	LARVAE					2	3.4						
CERATOPOGONIDAE SPP	LARVAE	3	11.4			12	19.4	29	22.4	27	37.6	27	17.8
PSYCHODIDAE SPP	LARVAE							7	11.5				
TIPULIDAE SPP	LARVAE									1	.4	1	.3

SPECIES:		2502		2502		2502		2502		
SPECIMEN			7		8		9		10	
FK LNG MM			27		38		27		28	
STOM FULL %			65		75		79		90	
BOLUS VOL MM**3			5.8		21.9		9.3		24.4	
DIG STATE			9		3		6		5	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	68.2	NO	57.3	NO	69.4	NO	60.7	56.8
INVERTEBRATES										
OLIGOCHAETA										
OLIGOCHAETA SPP	ADULTS	5	7.3	1	.3			1	.3	1.4
GASTROPODA										
ALDERIA SPP	ADULTS			8	10.5			1	3.5	5.0
ACARINA										
ACARINA SPP	ADULTS	4	.6					1	.2	.1
OSTRACODA										
OSTRACODA SPP	ADULTS			1	.6			3	.5	.5
COPEPODA										
HARPACTICOIDA SPP	ADULTS	31	5.7	8	.3	37	4.9	44	3.5	6.8
CUMACEA										
HEMILEUCON SPP	ADULTS									.4
ISOPODA										
GNORIMOSPHAEROMA LUTEA	ADULTS									1.9
AMPHIPODA										
COROPHIUM SPP	ADULTS									1.7
DIPTERA										
DIPTERA SPP	PUPAE									.4
MUSCIDAE SPP	LARVAE									.1
DOLICHOPODIDAE SPP	LARVAE					2	1.3			.5
CERATOPOGONIDAE SPP	LARVAE	9	4.6	51	22.7	21	24.4	58	31.3	21.3
PSYCHODIDAE SPP	LARVAE	2	2.3	1	.3					1.4
TIPULIDAE SPP	LARVAE	3	11.3							[illegible]

Table F-7. (Reference Table E-8)

AREA: IN HI
SAMPLER: HS
SITE: 1
SAMPLE: 1

SPECIES:			2502		2502		2502		2502		2502		2502
SPECIMEN			1		2		3		4		5		6
FK LNG MM			48		62		58		52		55		60
STOM FULL %			28		15		20		15		5		30
BOLUS VOL MM**3			17.6		21.9		17.6		8.8		1.0		32.8
DIG STATE			6		5		9		7		7		7
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	8.8	NO	49.8	NO	6.8	NO	62.1	NO	47.0	NO	5.0
INVERTEBRATES													
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS					1	1.9						
COPEPODA													
CALANOIDA SPP	ADULTS	274	90.0	135	39.2	145	84.6	41	34.5	21	43.0	131	50.0
HARPACTICOIDA SPP	ADULTS	13	1.8	87	7.5	32	4.8	18	3.4	6	5.0	43	3.3
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	1.8	5	2.7	3	3.1			1	5.0	7	41.7
DIPTERA													
DIPTERA SPP	LARVAE			1	1.6								

SPECIES:			1501	
SPECIMEN			7	
FK LNG MM			76	
STOM FULL %			50	
BOLUS VOL MM**3			12.5	
DIG STATE			2	
PREY		NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	33.6	30.2
INVERTEBRATES				
OLIGOCHAETA				
OLIGOCHAETA SPP	ADULTS			.2
COPEPODA				
CALANOIDA SPP	ADULTS			48.8
HARPACTICOIDA SPP	ADULTS			3.5
AMPHIPODA				
AMPHIPODA SPP	ADULTS	NO	33.3	4.8
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	33.3	12.4
DIPTERA				
DIPTERA SPP	LARVAE			.2

Table F-8. (Reference Table E-9)

AREA: MAT HI
SAMPLER: MS
SITE: 15
SAMPLE: 1

SPECIES:		2502		2502		2502		2502		2502		2502	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		39		38		45		41		46		43	
STOM FULL %		30		40		45		25		20		5	
BOLUS VOL MM**3		3.4		5.0		22.0		8.0		5.6		.1	
DIG STATE		1		1		2		2		2		1	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	99.0	NO	99.0	NO	97.0	NO	90.0	NO	60.0	NO	99.9
INVERTEBRATES													
NEMATODA													
PARASITIC SPP	ADULTS	2	1.0										
COPEPODA													
CALANOIDA SPP	ADULTS							1	2.5				
HARPACTICOIDA SPP	ADULTS			1	.3			13	3.5				
HEMIPTERA													
HEMIPTERA SPP	NYMPHS							2	4.0				
HEMIPTERA SPP	ADULTS					1	1.0						
DIPTERA													
DIPTERA SPP	ADULTS												
EPHYDRIDAE SPP	LARVAE												
CERATOPOGONIDAE SPP	LARVAE												
CHIRONOMIDAE SPP	LARVAE			1	.8	5	2.0			3	40.0		

SPECIES:		2502		2502		2502		2502		
SPECIMEN		7		8		9		10		
FK LNG MM		37		42		36		40		
STOM FULL %		15		70		50		10		
BOLUS VOL MM**3		1.8		15.6		5.4		.3		
DIG STATE		2		3		2		1		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	75.0	NO	43.0	NO	96.6	NO	100.0	86.1
INVERTEBRATES										
NEMATODA										
PARASITIC SPP	ADULTS					5	.5			.2
COPEPODA										
CALANOIDA SPP	ADULTS					5	.6			.3
HARPACTICOIDA SPP	ADULTS			25	6.0					1.0
HEMIPTERA										
HEMIPTERA SPP	NYMPHS									.4
HEMIPTERA SPP	ADULTS									.1
DIPTERA										
DIPTERA SPP	ADULTS			1	43.0					4.3
EPHYDRIDAE SPP	LARVAE	1	25.0							2.5
CERATOPOGONIDAE SPP	LARVAE			1	.5					.1
CHIRONOMIDAE SPP	LARVAE			9	7.5	3	.3			5.1

Table F-9. (Reference Table E-10)

AREA: HWT H1
SAMPLER: HS
SITE: 15
SAMPLE: 2

SPECIES:			1601		2502		1601		1601		1601		2502
SPECIMEN			1		2		3		4		5		6
FK LNG MM			63		55		55		57		60		54
STOM FULL %			92		75		65		46		45		30
BOLUS VOL MM**3			13.2		.4		6.4		.9		9.0		.8
DIG STATE			7		0		1		8		9		1
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	21.5	ND	100.0	ND	98.0	ND	99.5	ND	2.0	ND	96.0
INVERTEBRATES													
NEMATODA													
NEMATODA SPP	ADULTS												
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
COPEPODA													
CALANOIDA SPP	ADULTS					7	1.0	1	.2			35	1.0
HARPACTICOIDA SPP	ADULTS							3	.4			174	3.0
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS									1	98.0		
AMPHIPODA													
TALITRIDAE SPP	ADULTS	1	5.9										
DIPTERA													
CHIRONOMIDAE SPP	LARVAE					1	1.0						
CHIRONOMIDAE SPP	ADULTS												
FISH													
UNIDENTIFIED FIS	EGGS	39	74.8										

SPECIES:			1601		2502		2502		2502	
SPECIMEN			7		8		9		10	
FK LNG MM			54		54		53		55	
STOM FULL %			33		85		40		70	
BOLUS VOL MM**3			1.8		.9		4.8		3.6	
DIG STATE			2		8		8		7	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	96.6	ND	4.0	ND	7.8	ND	42.7	56.7
INVERTEBRATES										
NEMATODA										
NEMATODA SPP	ADULTS							1	.1	.0
OLIGOCHAETA										
OLIGOCHAETA SPP	ADULTS							1	.2	.0
COPEPODA										
CALANOIDA SPP	ADULTS	46	1.3	1356	96.0	1992	92.0	293	7.0	19.9
HARPACTICOIDA SPP	ADULTS	58	2.0			8	1.0	59	3.0	.9
ISOPODA										
GNORIMOSPHAEROMA LUTEA	ADULTS									9.8
AMPHIPODA										
TALITRIDAE SPP	ADULTS									.5
DIPTERA										
CHIRONOMIDAE SPP	LARVAE	1	.1					14	45.0	4.6
CHIRONOMIDAE SPP	ADULTS							1	2.0	.2
FISH										
UNIDENTIFIED	EGGS									7.6

Table F-10. (Reference Table E-11)

AREA: L SILT
SAMPLER: MS
SITE: 2
SAMPLE: 1

SPECIES:		1601		1601		1601		1601		1601		1601
SPECIMEN		1		2		3		4		5		6
FK LNG MM		42		58		57		52		42		34
STOM FULL %		80		45		65		48		68		48
BOLUS VOL MM**3		65.2		38.5		195.1		27.3		32.8		15.6
DIG STATE		7		8		3		2		5		2
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	17.3	ND	17.0	ND	55.4	ND	79.8	ND	46.4	ND	65.7
INVERTEBRATES													
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS												
COPEPODA													
CALANOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS												
CUMACEA													
HEMILEUCON SPP	ADULTS	1	2.8										
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS			1	16.0					1	16.2		
AMPHIPODA													
AMPHIPODA SPP	ADULTS	1	.3			ND	11.4	ND	2.5			ND	14.3
COROPHIUM SPP	ADULTS	34	78.8										
ANISOGAMMARUS CONFERVICOLU	ADULTS	3	1.4	4	54.3	9	32.2	1	14.8	3	40.4		
DIPTERA													
DIPTERA SPP	PUPAE												
CERATOPOGONIDAE SPP	LARVAE			4	8.5								
CHIRONOMIDAE SPP	LARVAE	3	1.8	3	4.2	3	1.8	2	3.7	4	3.8		
PSYCHODIDAE SPP	LARVAE												
TIPULIDAE SPP	LARVAE												

SPECIES:		1601		1601		1601		1601		2502		2502
SPECIMEN		7		8		9		10		11		12
FK LNG MM		37		29		26		23		30		44
STOM FULL %		65		40		80		60		75		80
BOLUS VOL MM**3		21.8		4.1		19.7		3.4		6.9		44.0
DIG STATE		5		6		8		8		4		5
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	43.3	ND	44.0	ND	3.8	ND	7.5	ND	20.3	ND	36.2
INVERTEBRATES													
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS											1	.3
OSTRACODA													
OSTRACODA SPP	ADULTS	1	.2									2	.3
COPEPODA													
CALANOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS	1	.2			3	2.8	2	.8	91	18.4	16	.4
CUMACEA													
HEMILEUCON SPP	ADULTS											1	.2
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS			1	18.4								
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
COROPHIUM SPP	ADULTS					12	95.0	4	91.7	1	4.3	3	8.5
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	25.0	1	26.9							1	7.4
DIPTERA													
DIPTERA SPP	PUPAE									1	7.4	15	24.1
CERATOPOGONIDAE SPP	LARVAE	12	31.3	3	17.9					22	48.0	23	18.3
CHIRONOMIDAE SPP	LARVAE												
PSYCHODIDAE SPP	LARVAE											1	1.3
TIPULIDAE SPP	LARVAE									1	1.1		

Table F-10. (Concluded)

AREA: L SILT
SAMPLER: MS
SITE: 2
SAMPLE: 1

SPECIES:		2532		2532		
SPECIMEN		13		14		
FK LNG MM		35		44		
STOM FULL %		50		80		
BOLUS VOL MM**3		3.8		125.0		
DIG STATE		7		6		
PREY		NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	69.8	ND	26.8	37.6
INVERTEBRATES						
POLYCHAETA						
AMPHARETIDAE SPP	ADULTS			7	33.8	2.4
ACARINA						
ACARINA SPP	ADULTS					.0
OSTRACODA						
OSTRACODA SPP	ADULTS			2	.1	.0
COPEPODA						
CALANOIDA SPP	ADULTS			1	.2	.0
HARPACTICOIDA SPP	ADULTS	32	3.2	7	.3	2.3
CUMACEA						
HEMILEUCON SPP	ADULTS					.2
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS					3.0
AMPHIPODA						
AMPHIPODA SPP	ADULTS			ND	6.2	2.5
COROPHIUM SPP	ADULTS			7	20.6	21.3
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	26.5	5	11.6	17.4
DIPTERA						
DIPTERA SPP	PUPAE			1	1.8	2.3
CERATOPOGONIDAE SPP	LARVAE	4	12.5			9.7
CHIRONOMIDAE SPP	LARVAE					.9
PSYCHODIDAE SPP	LARVAE					.1
TIPULIDAE SPP	LARVAE			1	2.3	.2

Table F-11. (Reference Table E-12)

GRAVEL & SILT
SAMPLER: MS
SITE: 2
SAMPLE: 2

SPECIES:			2502		2502		2502		2502		2502		2502
SPECIMEN			1		2		3		4		5		6
FK LNG MM			25		28		32		27		22		34
STOM FULL %			60		75		80		60		80		75
BOLUS VOL MM**3			4.3		10.7		35.9		6.9		4.9		17.6
DIG STATE			4		5		3		5		5		7
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	73.3	ND	69.5	ND	7.8	ND	51.7	ND	77.2	ND	34.3
INVERTEBRATES													
POLYCHAETA													
POLYCHAETA SPP	ADULTS			2	3.8								
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS									2	6.4		
GASTROPODA													
ALDERIA SPP	ADULTS											2	2.5
ARANEAE													
ARANEAE SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS									1	.4	1	.1
OSTRACODA													
OSTRACODA SPP	ADULTS			4	2.8			5	2.8	2	.6		
COPEPODA													
HARPACTICOIDA SPP	ADULTS	18	11.2	61	13.4	7	.4	79	11.5	32	18.3	63	3.7
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE							3	1.9				
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS												
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
COROPHIUM SPP	ADULTS	3	5.7										
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	2.3			5	5.3						
TALITRIDAE SPP	ADULTS					1	1.4	1	6.3				
INSECTA													
INSECTA SPP	LARVAE					1	1.4						
HOMOPTERA													
APHIDIDAE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	PUPAE											2	3.7
MUSCIDAE SPP	LARVAE	1	5.2	1	4.5			1	.8				
DOLICHOPODIDAE SPP	LARVAE												
CERATOPOGONIDAE SPP	LARVAE	1	.6	4	3.7			20	11.9	8	5.1	29	53.6
CHIRONOMIDAE SPP	LARVAE			2	3.0	92	83.7						
TIPULIDAE SPP	LARVAE							2	13.9			1	1.0

Table F-11. (Continued)

AREA: L SILT
SAMPLER: HS
SITE: 2
SAMPLE: 2

SPECIES:			2502		2502		2502		2502		1601		1601
SPECIMEN			7		8		9		10		11		12
FK LNG MM			61		25		30		29		76		56
STOM FULL %			75		70		65		75		75		65
BOLUS VOL MM**3			79.5		13.8		9.3		8.8		195.1		22.0
DIG STATE			5		4		5		7		7		6
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	50.0	NO	66.3	NO	68.3	NO	32.8	NO	30.8	NO	11.5
INVERTEBRATES													
POLYCHAETA													
POLYCHAETA SPP	ADULTS												
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS	10	9.8	4	2.9	3	2.3						
GASTROPODA													
ALDERIA SPP	ADULTS	8	17.3	2	1.5			4	8.0				
ARANEAE													
ARANEAE SPP	ADULTS	1	.7										
ACARINA													
ACARINA SPP	ADULTS					2	.5						
OSTRACODA													
OSTRACODA SPP	ADULTS					3	1.2	1	.5			1	2.3
COPEPODA													
HARPACTICOIDA SPP	ADULTS	7	.3	158	17.2	39	4.2	36	5.8				
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE												
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS									6	34.2	3	13.0
AMPHIPODA													
AMPHIPODA SPP	ADULTS									NO	1.7		
COROPHIUM SPP	ADULTS											4	34.6
ANISOGAMMARUS CONFERVICOLU	ADULTS	3	9.1					1	7.1	19	34.1	1	38.6
TALITRIDAE SPP	ADULTS												
INSECTA													
INSECTA SPP	LARVAE												
HOMOPTERA													
APHIDIDAE SPP	ADULTS					6	9.3						
DIPTERA													
DIPTERA SPP	PUPAE	1	1.8										
MUSCIDAE SPP	LARVAE					1	2.3						
DOLICHOPODIDAE SPP	LARVAE			1	.5			1	5.0				
CERATOPOGONIDAE SPP	LARVAE	15	5.6	15	3.7	7	6.0	21	27.7				
CHIRONOMIDAE SPP	LARVAE	2	.9					1	.5				
TIPULIDAE SPP	LARVAE	1	.3	2	7.9	2	13.9	2	12.6				

Table F-11. (Concluded)

AREA: L SILT
SAMPLER: MS
SITE: 2
SAMPLE: 2

SPECIES:			1601		1601		1601	
SPECIMEN			13		14		15	
FK LNG MM			34		38		34	
STOM FULL %			80		25		80	
BOLUS VOL MM**3			18.0		1.4		9.6	
DIG STATE			9		8		6	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	18.7	NO	43.8	NO	21.7	43.3
INVERTEBRATES								
POLYCHAETA								
POLYCHAETA SPP	ADULTS							.3
OLIGOCHAETA								
OLIGOCHAETA SPP	ADULTS							1.4
GASTROPODA								
AUGERIA SPP	ADULTS							2.6
ARANEAE								
ARANEAE SPP	ADULTS							.8
ACARINA								
ACARINA SPP	ADULTS							.1
OSTRACODA								
OSTRACODA SPP	ADULTS	3	5.8					.9
COPEPODA								
HARPACTICOIDA SPP	ADULTS	3	.7	2	1.2			5.3
CIRRIPEDIA								
CIRRIPEDIA SPP	LARVAE							.1
ISOPODA								
GNORIMOSPHAEROMA LUTEA	ADULTS	6	12.6	2	25.0	2	3.3	5.9
AMPHIPODA								
AMPHIPODA SPP	ADULTS	NO	21.6			NO	4.3	1.8
COROPHIUM SPP	ADULTS			1	5.8			3.1
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	43.8			3	60.7	13.5
TALITRIDAE SPP	ADULTS							.5
INSECTA								
INSECTA SPP	LARVAE							.1
HOMOPTERA								
APHIDIDAE SPP	ADULTS							.6
DIPTERA								
DIPTERA SPP	PUPAE							.3
MUSCIDAE SPP	LARVAE							.9
DOLICHOPODIDAE SPP	LARVAE							.[illegible]
CERATOPOGONIDAE SPP	LARVAE			1	25.0	2	5.7	10.0
CHIRONOMIDAE SPP	LARVAE							5.9
TIPULIDAE SPP	LARVAE					1	4.3	3.6

Table F-12. (Reference Table E-13)

AREA: SEDGE
SAMPLER: SS
SITE: 2
SAMPLE: 1

SPECIES:			1501		1601		1601		1601		1601		1601
SPECIMEN			1		2		3		4		5		6
FK LNG MM			60		47		47		63		25		53
STOM FULL %			75		75		60		75		50		50
BOLUS VOL MM**3			27.0		42.9		46.7		91.1		.5		14.0
DIG STATE			8		3		3		2		4		2
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	28.0	NO	46.4	NO	49.1	NO	60.0	NO	95.0	NO	88.0
INVERTEBRATES													
ACARINA													
ACARINA SPP	ADULTS	2	1.0										
COPEPODA													
HARPACTICOIDA SPP	ADULTS	1	.5			1	.2			1	5.0		
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS	1	33.0			1	49.1	2	40.0				
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
COROPHIUM SPP	ADULTS	3	37.0	1	11.6								
TALITRIDAE SPP	ADULTS			1	34.8								
DIPTERA													
DIPTERA SPP	LARVAE											1	10.0
DIPTERA SPP	ADULTS			1	2.9								
CERATOPOGONIDAE SPP	LARVAE	1	.5	3	4.3	4	1.6					9	2.0

SPECIES:			1501		1601	
SPECIMEN			7		8	
FK LNG MM			54		47	
STOM FULL %			100		30	
BOLUS VOL MM**3			125.0		8.0	
DIG STATE			6		7	
PREY		NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	55.0	NO	9.0	53.8
INVERTEBRATES						
ACARINA						
ACARINA SPP	ADULTS					.1
COPEPODA						
HARPACTICOIDA SPP	ADULTS					.7
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS					15.3
AMPHIPODA						
AMPHIPODA SPP	ADULTS	NO	22.0	NO	89.0	13.9
COROPHIUM SPP	ADULTS	4	22.0			8.8
TALITRIDAE SPP	ADULTS					4.3
DIPTERA						
DIPTERA SPP	LARVAE					1.3
DIPTERA SPP	ADULTS					.4
CERATOPOGONIDAE SPP	LARVAE	5	1.0	1	2.0	1.4

Table F-13. (Reference Table E-14)

AREA: SED02
SAMPLER: 45
SITE: 17
SAMPLE: 351

SPECIES:		2502		2502		2502		2502		2502		2502	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		31		36		31		35		42		34	
STOM FULL %		40		100		75		60		85		73	
BOLUS VOL MM**3		14.6		32.4		18.6		21.9		35.9		13.7	
DIG STATE		8		4		3		4		7		7	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	25.8	NO	82.0	NO	65.4	NO	93.2	NO	71.7	NO	54.6
ANIMAL MATL													
NEMATODA													
NEMATODA SPP	ADULTS							2	.3				
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS			1	3.0								
GASTROPODA													
ALDERIA SPP	ADULTS											4	1.8
ARANEAE													
ARANEAE SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS												
BRANCHIOPODA													
CLADOCERA SPP	ADULTS	1	.3	2	.3	9	2.0	2	.5				
PODON SPP	ADULTS	1	.3										
EVADNE SPP	JUVENILES	2	.5										
OSTRACODA													
OSTRACODA SPP	ADULTS			27	3.0	47	5.0						
COPEPODA													
CALANOIDA SPP	ADULTS							2	.6	1	.1		
HARPACTICOIDA SPP	ADULTS	24	3.8	69	3.0	58	4.7	69	4.4	26	1.7	225	28.2
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE			29	5.0	54	15.1	2	.5				
CUMACEA													
CUMACEA SPP	ADULTS												
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS												
AMPHIPODA													
COROPHIUM SPP	ADULTS			1	1.4							4	7.1
ANISOGAMMARUS CONFERVICOLU	ADULTS												
TALITRIDAE SPP	JUVENILES												
INSECTA													
INSECTA SPP	LARVAE					1	7.6						
DIPTERA													
DIPTERA SPP	LARVAE	5	2.0							4	.8		
EPHYDRIDAE SPP	LARVAE											5	4.7
MUSCIDAE SPP	LARVAE												
DOLICHOPODIDAE SPP	LARVAE											2	.9
CERATOPOGONIDAE SPP	LARVAE	24	60.8	18	2.3	1	.2	3	.5	12	5.1	36	10.7
TIPULIDAE SPP	LARVAE									4	28.8		

Table F-13. (Concluded)

SPECIES	AREA: GEO.E	2532		2502		2502		2532		1601		1601		1601	
SPECIMEN	SAMPLES: MS	7		8		9		10		11		12		13	
FK LNG MM	SITE: 17	31		32		22		27		115		116		85	
STOM FULL %	SAMPLE: 381	50		60		80		93		40		75		65	
BOLUS VOL MM**3		15.6		21.9		4.9		19.7		421.9		571.7		141.9	
DIG STATE		3		5		7		5		7		5		3	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNIDENTIFIED		NO	94.8	NO	77.6	NO	92.8	NO	84.2	NO	30.4	NO	82.7	NO	95.8	71.5
INVERTEBRATES																
NEMATODA																
NEMATODA SPP	ADULTS	13	.8													.1
POLYCHAETA																
AMPHARETIDAE SPP	ADULTS															.2
GASTROPODA																
ALDERIA SPP	ADULTS			5	1.8			2	.4							.3
ARANEAE																
ARANEAE SPP	ADULTS	1	.4													.0
ACARINA																
ACARINA SPP	ADULTS							1	.7							..
BRANCHIOPODA																
CLADOCERA SPP	ADULTS	28	1.6	3	.5	9	2.2	5	.7							.6
PODON SPP	ADULTS															.0
EVADNE SPP	JUVENILES															.6
OSTRACODA																
OSTRACODA SPP	ADULTS							2	.4			3	.1			.7
COPEPODA																
CALANOIDA SPP	ADULTS	3	.5	1	.2	17	2.9									.2
HARPACTICOIDA SPP	ADULTS	107	6.8	142	14.7	216	29.2	218	12.6	1	.1	1	.1			7.7
CIRRIPEDIA																
CIRRIPEDIA SPP	LARVAE	4	1.1													1.7
CUMACEA																
CUMACEA SPP	ADULTS			1	.6											.0
ISOPODA																
GNORIMOSPHAEROMA LUTEA	ADULTS									1	3.7	6	12.2			1.2
AMPHIPODA																
COROPHIUM SPP	ADULTS			3	1.6	1	1.8	1	2.1			4	4.4	7	5.0	1.4
ANISOGAMMARUS CONFERVICOLU	ADULTS									1	3.7					.3
TALITRIDAE SPP	JUVENILES			1	2.4											.2
INSECTA																
INSECTA SPP	LARVAE															.6
DIPTERA																
DIPTERA SPP	LARVAE					1	.2									.2
EPHYDRIDAE SPP	LARVAE									1	1.5					.1
MUSCIDAE SPP	LARVAE							1	.9							.1
DOLICHOPODIDAE SPP	LARVAE							1	.5							.1
CERATOPOGONIDAE SPP	LARVAE	4	.4	2	.5	15	11.7	2	2.0	1	.3	27	.5			3.0
TIPULIDAE SPP	LARVAE															1.6

Table F-14. (Reference Table E-14)

AREA: SEDGE
SAMPLER: MS
SITE: 17
SAMPLE: 061

SPECIES:			1601		2201		2562	
SPECIMEN			1		2		3	
FK LNG MM			98		75		29	
STOM FULL %			98		70		65	
BOLUS VOL MM**3			28.0		20.0		2.3	
DIG STATE			7		4		2	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	35.8	NO	73.6	NO	63.9	57.6
INVERTEBRATES								
NEMATODA								
NEMATODA SPP	ADULTS					1	.1	.0
BRANCHIOPODA								
EVADNE SPP	ADULTS			1	.5			.2
COPEPODA								
HARPACTICOIDA SPP	ADULTS					13	2.0	.7
ISOPODA								
GNORIMOSPHAEROMA LUTEA	ADULTS			1	3.0			1.0
AMPHIPODA								
COROPHIUM SPP	ADULTS	4	13.0	5	1.0	9	4.0	6.0
ANISOGAMMARUS CONFERVICOLU	ADULTS	9	52.0	5	22.0	6	26.0	33.3
DIPTERA								
DIPTERA SPP	LARVAE			1	.1			.0
CERATOPOGONIDAE SPP	LARVAE					8	4.0	1.3

Table F-15. (Reference Table E-15)

AREA: MAT HI
SAMPLER: HS
SITE: 14
SAMPLE: 201

SPECIES:			2502		2502		2502		2502		2502		2502
SPECIMEN			1		2		3		4		5		6
FK LNG MM			38		40		54		48		36		36
STOM FULL %			80		80		60		60		75		65
BOLUS VOL MM**3			19.7		23.2		9.8		18.7		21.9		6.0
DIG STATE			7		3		6		6		5		3
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	35.8	NO	67.9	NO	24.1	NO	36.9	NO	51.8	NO	30.8
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS											1	.1
NEMATODA													
PARASITIC SPP	ADULTS			5	.3								
POLYCHAETA													
POLYCHAETA SPP	ADULTS	3	5.2							14	12.8		
AMPHARETIDAE SPP	ADULTS	2	5.7	4	16.2					5	18.6		
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
GASTROPODA													
GASTROPODA SPP	ADULTS												
ARTHROPODA													
ARTHROPODA SPP	JUVENILES							3	.1				
ACARINA													
ACARINA SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS							2	.5				
COPEPODA													
CALANOIDA SPP	ADULTS							6	1.1				
HARPACTICOIDA SPP	ADULTS	19	2.5	112	9.3	1	.1	172	27.7	24	2.1	266	46.8
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE							1	.4			16	18.8
CUMACEA													
CUMACEA SPP	ADULTS												
HEMILEUCON SPP	ADULTS	1	1.5	1	.6					1	2.1		
TANAIDACEA													
TANAIDACEA SPP	ADULTS	27	28.0	4	1.8	7	5.7			31	17.8		
AMPHIPODA													
AMPHIPODA SPP	JUVENILES	2	2.8										
COROPHIUM SPP	ADULTS	11	21.3	2	3.7	3	15.4	2	28.8	3	3.6	1	1.5
ANISOGAMMARUS CONFERVICOLU	ADULTS											1	4.9
AMPITHOE SPP	ADULTS					1	19.8	2	12.5				
INSECTA													
INSECTA SPP	ADULTS												
HOMOPTERA													
CICADELLIDAE SPP	ADULTS												
APHIDIDAE SPP	ADULTS					1	.7						
DIPTERA													
DIPTERA SPP	PUPAE	1	.7										
MUSCIDAE SPP	LARVAE					1	24.1						
DOLICHOPODIDAE SPP	LARVAE	1	3.3			1	7.8						
CERATOPOGONIDAE SPP	LARVAE	2	.8							1	.4		
CHIRONOMIDAE SPP	LARVAE	4	2.8							1	.4		
TIPULIDAE SPP	LARVAE					11	3.1						
MYCETOPHILIDAE SPP	LARVAE												
HYMENOPTERA													
HYMENOPTERA SPP	ADULTS												

Table F-15. (Concluded)

AREA: MAT HI
SAMPLER: MS
SITE: 14
SAMPLE: 201

SPECIES:		2502		2502		2502		2502		
SPECIMEN		7		8		9		10		
FK LNG MM		29		41		43		44		
STOM FULL %		50		50		60		45		
BOLUS VOL MM**3		1.0		15.6		22.0		8.0		
DIG STATE		7		4		4		8		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	35.8	NO	44.7	NO	66.2	100	20.7	41.2
INVERTEBRATES										
PROTOZOA										
FORAMINIFERA SPP	ADULTS			1	.1	1	.3			.1
NEMATODA										
PARASITIC SPP	ADULTS	4	4.7							.5
POLYCHAETA										
POLYCHAETA SPP	ADULTS			4	4.1	2	.4			2.3
AMPHARETIDAE SPP	ADULTS			6	40.6					7.3
OLIGOCHAETA										
OLIGOCHAETA SPP	ADULTS					12	18.1			1.8
GASTROPODA										
GASTROPODA SPP	ADULTS					3	2.6			.3
ARTHROPODA										
ARTHROPODA SPP	JUVENILES									.0
ACARINA										
ACARINA SPP	ADULTS	2	2.8							.2
OSTRACODA										
OSTRACODA SPP	ADULTS									.1
COPEPODA										
CALANOIDA SPP	ADULTS							2	.6	.2
HARPACTICOIDA SPP	ADULTS	62	43.8	20	2.4	5	.4	410	71.7	13.7
CIRRIPEDIA										
CIRRIPEDIA SPP	LARVAE					2	.4	1	.6	1.1
CUMACEA										
CUMACEA SPP	ADULTS							1	1.6	.2
HEMILEUCON SPP	ADULTS									.4
TANAIDACEA										
TANAIDACEA SPP	ADULTS			3	1.6					4.6
AMPHIPODA										
AMPHIPODA SPP	JUVENILES							1	.6	.3
COROPHIUM SPP	ADULTS			1	4.1	1	1.0			7.1
ANISOGAMMARUS CONFERVICOLU	ADULTS									.5
AMPITHOE SPP	ADULTS									3.2
INSECTA										
INSECTA SPP	ADULTS							NO	3.2	.3
HOMOPTERA										
CICADELLIDAE SPP	ADULTS					1	4.0			.4
APHIDIDAE SPP	ADULTS			1	2.0					.3
DIPTERA										
DIPTERA SPP	PUPAE									.1
MUSCIDAE SPP	LARVAE									2.4
DOLICHOPODIDAE SPP	LARVAE									1.0
CERATOPOGONIDAE SPP	LARVAE									.1
CHIRONOMIDAE SPP	LARVAE	3	17.5	1	.4					2.0
TIPULIDAE SPP	LARVAE									.3
MYCETOPHILIDAE SPP	LARVAE					3	6.6			.7
HYMENOPTERA										
HYMENOPTERA SPP	ADULTS							1	1.0	.1

Table F-16. (Reference Table E-18)

AREA: SEDGE
SAMPLER: LS
SITE: 10
SAMPLE: 1

SPECIES:		2201		2201		2201		2201		2201		2201	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		129		108		85		118		78		76	
STOM FULL %		5		0		0		0		60		70	
BOLUS VOL MM**3		13.6		0		0		0		173.0		148.9	
DIG STATE		1		0		0		0		3		3	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	100.0							NO	57.7	NO	52.1
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS												
NEMATODA													
NEMATODA SPP	ADULTS												
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS											20	37.2
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
GASTROPODA													
ALDERIA SPP	ADULTS												
ARANEAE													
ARANEAE SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS											3	.1
COPEPODA													
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS											1	.1
CUMACEA													
HEMILEUCON SPP	ADULTS									1	1.9	11	1.7
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS												
IDOTEIDAE SPP	ADULTS												
AMPHIPODA													
AMPHIPODA SPP	ADULTS									1	1.9		
COROPHIUM SPP	JUVENILES												
COROPHIUM SPP	ADULTS									21	38.5	5	1.1
ANISOGAMMARUS CONFERVICOLU	ADULTS											4	6.3
DECAPODA													
CRANGON NIGRICAUDA	ADULTS												
BRACHYURA SPP	MEGALOPS											1	1.4
INSECTA													
INSECTA SPP	ADULTS												
INSECTA SPP	LARVAE												
HOMOPTERA													
APHIDIDAE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	LARVAE												
CERATOPOGONIDAE SPP	LARVAE												
FISH													
EMBIOTOCIDAE													
SHINER SURFPERCH UNSPECIFIED													

Table F-16. (Continued)

AREA: CEDLE
SAMPLER: LS
SITE: 18
SAMPLE: 1

SPECIES:		2201		2201		2201		2261		1601		1601	
SPECIMEN		7		8		9		10		11		12	
FK LNG MM		64		62		78		57		173		147	
STOM FULL %		50		53		10		80		80		0	
BOLUS VOL MM**3		48.8		54.9		4.9		85.2		6750.0		0	
DIG STATE		4		3		3		4		9		0	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	87.0	NO	43.6	NO	66.0	NO	23.5	NO	2.0		
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS	1	.1										
NEMATODA													
NEMATODA SPP	ADULTS												
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS					1	15.2						
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
GASTROPODA													
ALDERIA SPP	ADULTS							15	57.2				
ARANEAE													
ARANEAE SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS	1	.2	1	.1	1	.7						
COPEPODA													
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS	1	.1	1	.1	3	2.3						
CUMACEA													
HEMILEUCON SPP	ADULTS	2	.8			1	2.7						
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS												
IDOTEIDAE SPP	ADULTS												
AMPHIPODA													
AMPHIPODA SPP	ADULTS							NO	7.0				
COROPHIUM SPP	JUVENILES					5	9.1						
COROPHIUM SPP	ADULTS	10	10.2	NO	56.1			7	12.3				
ANISOGAMMARUS CONFERVICOLU	ADULTS					2	9.2						
DECAPODA													
CRANGON NIGRICAUDA	ADULTS												
BRACHYURA SPP	MEGALOPS												
INSECTA													
INSECTA SPP	ADULTS												
INSECTA SPP	LARVAE												
HOMOPTERA													
APHIDIDAE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	LARVAE												
CERATOPOGONIDAE SPP	LARVAE	1	1.5										
FISH													
EMBIOTOCIDAE													
SHINER SURFPERCH UNSPECIFIED										1	98.0		

Table F-16. (Continued)

AREA: SEDGE
SAMPLER: LS
SITE: 18
SAMPLE: 1

SPECIES:		1601		1601		3401		4402		4402		4402	
SPECIMEN		13		14		15		16		17		18	
FK LNG MM		115		101		164		105		99		122	
STOM FULL %		50		3		10		75		63		75	
BOLUS VOL MM**3		421.9		1.0		27.0		752.0		639.0		722.0	
DIG STATE		3		1		1		5		5		6	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	95.0	ND	100.0	ND	100.0	ND	95.3	ND	80.2	ND	3.0
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS												
NEMATODA													
NEMATODA SPP	ADULTS												
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS												
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
GASTROPODA													
ALDERIA SPP	ADULTS												
ARANEAE													
ARANEAE SPP	ADULTS									3	.6		
OSTRACODA													
OSTRACODA SPP	ADULTS												
COPEPODA													
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS												
CUMACEA													
HEMILEUCON SPP	ADULTS												
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS							1	1.4				
IDOTEIDAE SPP	ADULTS							2	.7				
AMPHIPODA													
AMPHIPODA SPP	ADULTS							ND	.3	1	.8	ND	10.0
COROPHIUM SPP	JUVENILES												
COROPHIUM SPP	ADULTS	2	3.0							6	5.6	2	2.0
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	2.0					1	1.2	1	.2	67	85.0
DECAPODA													
CRANGON NIGRICAUDA	ADULTS							1	.5				
BRACHYURA SPP	MEGALOPS												
INSECTA													
INSECTA SPP	ADULTS									ND	10.1		
INSECTA SPP	LARVAE							ND	.1				
HOMOPTERA													
APHIDIDAE SPP	ADULTS							2	.5	1	.2		
DIPTERA													
DIPTERA SPP	LARVAE									2	2.3		
CERATOPOGONIDAE SPP	LARVAE												
FISH													
EMBIOTOCIDAE													
SHINER SURFPERCH UNSPECIFIED													

Table F-16. (Continued)

GREAT SEDGE
SAMPLER: LS
SITE: 10
SAMPLE: 1

SPECIES:	4402	4402	4402	4001	3901	3901
SPECIMEN	19	20	21	22	23	24
FK LNG MM	100	96	88	125	107	83
STOM FULL %	30	50	65	25	60	75
BOLUS VOL MM**3	343.0	274.6	185.9	64.4	48.0	18.9
DIG STATE	6	4	5	6	6	7

PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	48.8	NO	94.8	NO	45.2	NO	39.3	NO	32.9	NO	15.6	58.4
INVERTEBRATES														
PROTOZOA														
FORAMINIFERA SPP	ADULTS													.0
NEMATODA														
NEMATODA SPP	ADULTS					8	2.0							.1
POLYCHAETA														
AMPHARETIDAE SPP	ADULTS							6	53.5					5.3
OLIGOCHAETA														
OLIGOCHAETA SPP	ADULTS							5	1.8					.1
GASTROPODA														
ALDERIA SPP	ADULTS													2.9
ARANEAE														
ARANEAE SPP	ADULTS													.0
OSTRACODA														
OSTRACODA SPP	ADULTS									1	.1			.1
COPEPODA														
CYCLOPOIDA SPP	ADULTS	1	1.0											.1
HARPACTICOIDA SPP	ADULTS													.1
CUMACEA														
HEMILEUCON SPP	ADULTS													.4
ISOPODA														
GNORIMOSPHAEROMA LUTEA	ADULTS													.1
IDOTEIDAE SPP	ADULTS													.0
AMPHIPODA														
AMPHIPODA SPP	ADULTS	NO	13.0											1.9
COROPHIUM SPP	JUVENILES													.5
COROPHIUM SPP	ADULTS	1	1.0			3	7.6	3	5.4			2	10.6	7.7
ANISOGAMMARUS CONFERVICOLU	ADULTS	19	46.0	NO	5.5	15	45.2			14	67.0	9	73.6	16.6
DECAPODA														
CRANGON NIGRICAUDA	ADULTS													.0
BRACHYURA SPP	MEGALOPS													.1
INSECTA														
INSECTA SPP	ADULTS													.5
INSECTA SPP	LARVAE			1	.5									.0
HOMOPTERA														
APHIDIDAE SPP	ADULTS													.0
DIPTERA														
DIPTERA SPP	LARVAE													.1
CERATOPOGONIDAE SPP	LARVAE													.1
FISH														
EMBIOTOCIDAE														
SHINER SURFPERCH UNSPECIFIED														4.9

Table F-16. (Concluded)

AREA: SEDGE
SAMPLER: LS
SITE: 10
SAMPLE: 1

SPECIES:		2201		2201		2201		2201		2201		2201	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		79		127		108		87		129		119	
STOM FULL %		65		5		13		35		0		10	
BOLUS VOL MM**3		13.0		8.0		27.0		42.9		0		35.9	
DIG STATE		6		1		1		3		0		3	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	31.9	NO	100.0	NO	100.0	NO	76.3			NO	79.3
INVERTEBRATES													
POLYCHAETA													
POLYCHAETA SPP	ADULTS							NO	14.3			1	4.8
OSTRACODA													
OSTRACODA SPP	ADULTS											1	.3
COPEPODA													
HARPACTICOIDA SPP	ADULTS							1	.2				
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE							3	.4				
MYSIDACEA													
MYSIDACEA SPP	ADULTS	1	3.5										
CUMACEA													
HEMILEUCON SPP	ADULTS	3	3.9									1	.4
AMPHIPODA													
COROPHIUM SPP	ADULTS	11	43.6					9	8.0			9	15.5
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	3.5										
DIPTERA													
PSYCHODIDAE SPP	LARVAE	1	1.0										

SPECIES:		2201		2201		
SPECIMEN		7		8		
FK LNG MM		112		98		
STOM FULL %		10		12		
BOLUS VOL MM**3		66.0		64.0		
DIG STATE		3		3		
PREY		NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	63.0	NO	73.6	75.0
INVERTEBRATES						
POLYCHAETA						
POLYCHAETA SPP	ADULTS	1	6.0	2	8.2	4.6
OSTRACODA						
OSTRACODA SPP	ADULTS					.0
COPEPODA						
HARPACTICOIDA SPP	ADULTS			1	.1	.0
CIRRIPEDIA						
CIRRIPEDIA SPP	LARVAE					.1
MYSIDACEA						
MYSIDACEA SPP	ADULTS					.5
CUMACEA						
HEMILEUCON SPP	ADULTS			4	1.0	1.7
AMPHIPODA						
COROPHIUM SPP	ADULTS	10	30.2	23	18.3	17.2
ANISOGAMMARUS CONFERVICOLU	ADULTS					.5
DIPTERA						
PSYCHODIDAE SPP	LARVAE					.3

Table F-17. (Reference to Table E-22)

SPECIES	ARTIFL SAND		4002		4002		4002		4002		4002		1601
SPECIMEN	SAMPLERS NS		1		2		3		4		5		6
FK LNG MM	SITE 1		35		55		46		44		33		62
STOM FULL %	SAMPLE 2		50		80		53		43		58		68
BOLUS VOL MM**3			7.2		59.3		15.6		19.7		4.9		144.9
DIG STATE			8		7		5		5		7		6
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	8.4	NO	26.2	NO	8.6	NO	20.3	NO	18.4	NO	35.8
INVERTEBRATES													
NEMERTEA													
NEMERTEA SPP	ADULTS			6	9.3								
NEMATODA													
PARASITIC SPP	ADULTS												
POLYCHAETA													
POLYCHAETA SPP	ADULTS			23	5.5	NO	51.7	4	6.0				
POLYCHAETA SPP	JUVENILES	4	4.9										
ETEONE SPP	ADULTS	1	32.5										
PSEUDOPOLYDORA SPP	ADULTS			2	10.3					4	6.4		
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS	3	1.6			5	3.5	5	2.5	2	.8		
OSTRACODA													
OSTRACODA SPP	ADULTS												
COPEPODA													
CYCLOPOIDA SPP	ADULTS											1	.5
HARPACTICOIDA SPP	ADULTS	3	.6	2	.1	2	.4	7	2.5	94	36.0		
TANAIDACEA													
TANAIDACEA SPP	ADULTS	18	52.8	74	48.6	14	35.8	18	65.0	11	36.6	317	61.8
ISOPODA													
IDOTEIDAE SPP	ADULTS												
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
AMPHIPODA SPP	JUVENILES							2	4.0	1	10.4	7	2.0
COROPHIUM SPP	ADULTS											2	.7
CAPRELLIDAE SPP	ADULTS												

SPECIES			1601		1601		1601		1601		1601	
SPECIMEN			7		8		9		10		11	
FK LNG MM			53		45		55		60		51	
STOM FULL %			73		75		25		50		88	
BOLUS VOL MM**3			148.9		54.9		13.8		39.3		91.1	
DIG STATE			6		7		5		6		7	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	17.1	NO	24.3	NO	59.7	NO	34.7	NO	24.6	24.6
INVERTEBRATES												
NEMERTEA												
NEMERTEA SPP	ADULTS											.6
NEMATODA												
PARASITIC SPP	ADULTS									1	.6	.0
POLYCHAETA												
POLYCHAETA SPP	ADULTS											5.7
POLYCHAETA SPP	JUVENILES											.4
ETEONE SPP	ADULTS											3.6
PSEUDOPOLYDORA SPP	ADULTS											1.5
OLIGOCHAETA												
OLIGOCHAETA SPP	ADULTS											.8
OSTRACODA												
OSTRACODA SPP	ADULTS			2	.7							.1
COPEPODA												
CYCLOPOIDA SPP	ADULTS											.3
HARPACTICOIDA SPP	ADULTS		.	2	.4	1	.5					3.7
TANAIDACEA												
TANAIDACEA SPP	ADULTS	118	53.8	43	72.8	8	34.8	90	64.8	141	45.0	53.6
ISOPODA												
IDOTEIDAE SPP	ADULTS	2	.8							6	3.3	.4
AMPHIPODA												
AMPHIPODA SPP	ADULTS	1	27.4	1	1.0	.	9.8	1	.9			3.2
AMPHIPODA SPP	JUVENILES	3	1.7							4	1.2	1.6
COROPHIUM SPP	ADULTS									2	4.9	.5
CAPRELLIDAE SPP	ADULTS									1	.8	.1

Table F-18. (Reference Table E-25)

AREA: N TRWL
SAMPLER: OT
SITE: 3
SAMPLE: 1

SPECIES:		5601	2902	4002	2901	1601	2901
SPECIMEN		1	2	3	4	5	6
FK LNG MM		244	73	93	88	130	31
STOM FULL %		5	95	0	90	0	85
BOLUS VOL MM**3		2.5	13.1	0	9.0	0	33.6
DIG STATE		1	6	0	4	0	6

PREY		NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %
UNSPECIFIED		NO 5.0	NO 16.0		NO 1.0		NO 3.0
INVERTEBRATES							
POLYCHAETA							
AMPHARETIDAE SPP	ADULTS						1 97.0
OSTRACODA							
OSTRACODA SPP	ADULTS						
COPEPODA							
CALANOIDA SPP	ADULTS		1 1.0				
HARPACTICOIDA SPP	ADULTS						
CUMACEA							
CUMELLA SPP	ADULTS						
AMPHIPODA							
AMPHIPODA SPP	ADULTS		4 4.0				
COROPHIUM SPP	ADULTS		4 3.0				
AMPITHOE SPP	ADULTS						
CAPRELLIDAE SPP	ADULTS		73 53.0				
DECAPODA							
DECAPODA SPP	LARVAE		1 23.0				
CRANGON FRANCISCORUM	ADULTS						
PANDALUS DANAE	ADULTS	1 95.0					
FISH							
UNIDENTIFIED	UNSPECIFIED				1 99.0		

SPECIES:		1602	5301	2901	1601	901	3301
SPECIMEN		7	8	9	[illegible]	[illegible]	[illegible]
FK LNG MM		82	75	87	86	86	78
STOM FULL %		0	20	45	34	44	5
BOLUS VOL MM**3		0	.1	4.2	2.2	9.5	.1
DIG STATE		0	7	2	1	4	5

PREY		NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	MEAN VOL %
UNSPECIFIED			NO 23.0	NO 3.0	NO 100.0	NO 29.0	NO 2.0	23.2
INVERTEBRATES								
POLYCHAETA								
AMPHARETIDAE SPP	ADULTS							10.3
OSTRACODA								
OSTRACODA SPP	ADULTS		3 3.0	5 2.0			1 25.0	3.6
COPEPODA								
CALANOIDA SPP	ADULTS		6 2.0					.3
HARPACTICOIDA SPP	ADULTS		126 64.0					7.0
CUMACEA								
CUMELLA SPP	ADULTS		2 2.0					.2
AMPHIPODA								
AMPHIPODA SPP	ADULTS							.4
COROPHIUM SPP	ADULTS							.3
AMPITHOE SPP	ADULTS							9.1
CAPRELLIDAE SPP	ADULTS						2 73.0	6.0
DECAPODA								
DECAPODA SPP	LARVAE					1 1.0		2.6
CRANGON FRANCISCORUM	ADULTS							7.0
PANDALUS DANAE	ADULTS					3 70.0		10.6
FISH								
UNIDENTIFIED	UNSPECIFIED			1 95.0				21.6

Table F-19. (Reference Table E-25)

AREA: N TAHL
SAMPLER: JT
SITE: 1
SAMPLE: 1

PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
SPECIES:			4003		2401		1801		4002		2901		4002		1501		3901		2502		1601	
SPECIMEN			1		2		3		4		5		6		7		8		9		12	
FK LNG MM			181		119		108		47		95		74		65		92		57		77	
STOM FULL %			92		92		0		55		48		88		98		65		55		6	
BOLUS VOL MM**3			15.5		21.6		6		3.0		13.2		7.3		47.5		2.2		4.5		0	
DIG STATE			3		6		0		5		5		6		7		6		7		0	
UNSPECIFIED				ND	25.0			ND	6.4	ND	2.7	ND	.5	ND	95.5	ND	2.0	ND	24.9			13.6
INVERTEBRATES																						
UNSPECIFIED SPP	ADULTS																	16	7.0			.5
ARANEAE																						
ARANEAE SPP	ADULTS																	2	4.0			.5
OSTRACODA																						
OSTRACODA SPP	ADULTS																	1	1.0			.1
COPEPODA																						
CALANOIDA SPP	ADULTS																	162	11.0			1.4
HARPACTICOIDA SPP	ADULTS									16	.2							313	27.0			3.4
CUMACEA																						
CUMELLA SPP	ADULTS							1	.2									1	1.0			.2
TANAIDACEA																						
TANAIDACEA SPP	ADULTS																	7	4.0			.5
ISOPODA																						
IDOTEIDAE SPP	ADULTS															3	14.0	2	2.0			2.0
AMPHIPODA																						
AMPHIPODA SPP	ADULTS							43	83.0													18.4
COROPHIUM SPP	ADULTS							9	10.0									2	1.0			1.4
ANISOGAMMARUS CONFERVICOLU	ADULTS									1	.1											.0
AMPITHOE SPP	ADULTS																	1	2.0			.3
CAPRELLIDAE SPP	ADULTS															39	84.0					10.5
DECAPODA																						
DECAPODA SPP	LARVAE																	8	13.0			1.6
CRANGON FRANCISCORUM	ADULTS	1	100.0	3	75.0									2	94.0							33.6
CRANGON NIGRICAUDA	ADULTS																	1	6.0			.8
CRANGON SPP	ADULTS													2	.5							.1
DIPTERA																						
DIPTERA SPP	ADULTS																	1	4.0			.5
PSYCHODIDAE SPP	ADULTS																	2	3.0			.4
FISH																						
UNIDENTIFIED	LARVAE												99.5									12.4
PLEURONECTIDAE																						
ENGLISH SOLE	LARVAE									2	97.0											12.1

Table F-20. (Reference Table E-26)

AREA: S TRWL
SAMPLER: OT
SITE: 12
SAMPLE: 1

SPECIES:			6001		1601		2201		1601		4301		4001
SPECIMEN			1		2		3		4		5		6
FK LNG MM			193		137		79		174		135		144
STOM FULL %			80		80		80		15		63		75
BOLUS VOL MM**3			13.7		21.6		1.6		28.5		72.9		18.9
DIG STATE			5		3		1		2		3		3
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	13.3	NO	65.5	NO	99.5	NO	99.0	NO	82.0	NO	88.5
INVERTEBRATES													
NEMATODA													
NEMATODA SPP	ADULTS												
POLYCHAETA													
CAPITELLIDAE SPP	ADULTS											1	.5
AMPHARETIDAE SPP	ADULTS									5	2.0	1	1.0
POLYDORA SPP	ADULTS											6	4.0
BIVALVIA													
BIVALVIA SPP	ADULTS	2	88.0										
OSTRACODA													
OSTRACODA SPP	ADULTS					1	.5						
MYSIDACEA													
MYSIDACEA SPP	ADULTS			1	.5								
AMPHIPODA													
COROPHIUM SPP	ADULTS	1	1.0	16	33.0					35	16.0	5	2.0
ANISOGAMMARUS CONFERVICOLU	ADULTS							1	1.0				
DECAPODA													
DECAPODA SPP	LARVAE			2	24.0								
INSECTA													
INSECTA SPP	LARVAE	1	.7										

SPECIES:			1601		1601		6001		4001	
SPECIMEN			7		8		9		10	
FK LNG MM			125		112		322		387	
STOM FULL %			95		93		0		15	
BOLUS VOL MM**3			125.0		24.8		0		56.4	
DIG STATE			1		2		0		1	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	100.0	NO	97.5			NO	2.0	69.4
INVERTEBRATES										
NEMATODA										
NEMATODA SPP	ADULTS			2	.5					.1
POLYCHAETA										
CAPITELLIDAE SPP	ADULTS									.1
AMPHARETIDAE SPP	ADULTS									.3
POLYDORA SPP	ADULTS									.9
BIVALVIA										
BIVALVIA SPP	ADULTS							2	98.0	28.7
OSTRACODA										
OSTRACODA SPP	ADULTS									.1
MYSIDACEA										
MYSIDACEA SPP	ADULTS									.1
AMPHIPODA										
COROPHIUM SPP	ADULTS			4	2.0					9.7
ANISOGAMMARUS CONFERVICOLU	ADULTS									.1
DECAPODA										
DECAPODA SPP	LARVAE									2.7
INSECTA										
INSECTA SPP	LARVAE									.1

Table F-21. (Reference Table E-26)

AREA: S TRWL
SAMPLER: OT
SITE: 15
SAMPLE: 1

SPECIES:			1501		4001		1601		4001		4001		1601
SPECIMEN			1		2		3		4		5		6
FK LNG MM			128		119		97		126		124		72
STOM FULL %			90		60		78		65		58		92
BOLUS VOL MM**3			55.3		26.5		13.3		7.2		38.0		17.6
DIG STATE			6		8		5		7		8		6
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		NO	35.5	NO	11.5	NO	24.0	NO	7.0	NO	8.0	NO	1.0
INVERTEBRATES													
POLYCHAETA													
CAPITELLIDAE SPP	ADULTS							1	3.0				
GLYCERA SPP	ADULTS			31	88.0			22	88.0	25	90.0		
BIVALVIA													
BIVALVIA SPP	ADULTS							1	1.0	1	2.0		
CUMACEA													
CUMELLA SPP	ADULTS												
ISOPODA													
ISOPODA SPP	ADULTS	1	3.0										
AMPHIPODA													
COROPHIUM SPP	ADULTS	1	1.0	1	.5			1	1.0				
GAMMARIDEA SPP	ADULTS	1	.5										
ANISOGAMMARUS CONFERVICOLU	ADULTS					12	74.0					1	4.0
TALITRIDAE SPP	ADULTS	1	2.0			1	2.0						
DECAPODA													
CRANGON FRANCISCORUM	ADULTS	1	55.0									1	95.0

SPECIES:			4001		4001		4001		4001	
SPECIMEN			7		8		9		10	
FK LNG MM			122		122		69		65	
STOM FULL %			95		87		77		76	
BOLUS VOL MM**3			45.3		24.3		11.2		9.7	
DIG STATE			7		8		7		7	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		NO	5.0	NO	17.0	NO	21.0	NO	1.2	13.4
INVERTEBRATES										
POLYCHAETA										
CAPITELLIDAE SPP	ADULTS									.3
GLYCERA SPP	ADULTS	21	77.0	19	80.0	8	75.0			49.6
BIVALVIA										
BIVALVIA SPP	ADULTS	NO	15.0	3	2.0					2.3
CUMACEA										
CUMELLA SPP	ADULTS					1	1.0	2	.8	.2
ISOPODA										
ISOPODA SPP	ADULTS									.3
AMPHIPODA										
COROPHIUM SPP	ADULTS			1	1.0	4	3.0	135	98.0	10.4
GAMMARIDEA SPP	ADULTS									.1
ANISOGAMMARUS CONFERVICOLU	ADULTS									7.8
TALITRIDAE SPP	ADULTS									.4
DECAPODA										
CRANGON FRANCISCORUM	ADULTS									15.0

Higley, Duane L.
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